APR 19 1938

April 18, 1938

STEEL

PRODUCTION • PROCESSING • DISTRIBUTION • USE

FOR FORTY-EIGHT YEARS—IRON TRADE REVIEW

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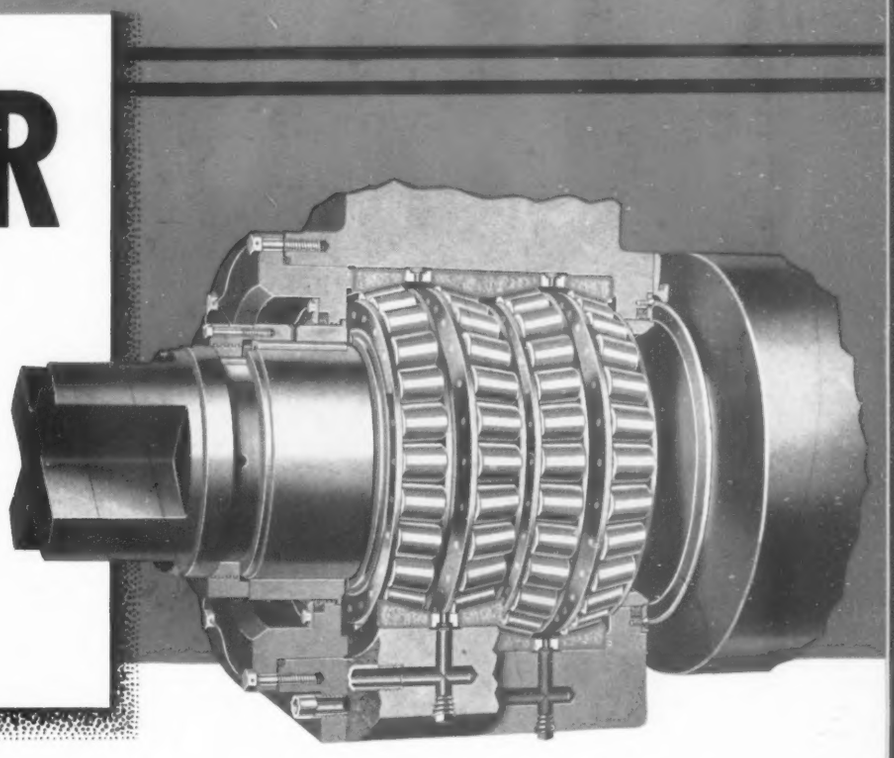

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Comments

Readers are invited to comment upon articles, editorials, reports, prices or other editorial material appearing in STEEL. The editors cannot publish unsigned communications, but at their discretion may permit a writer to use a pseudonym when a bona fide reason exists for withholding his identity. Letters should be brief—preferably not exceeding 250 words.

Publicity Aids Tax Reform

To the Editor:

We note with interest the editorial on page 35 of your March 28 issue of STEEL. ("Industry groans under tax impositions.")

Inasmuch as we wrote you Jan. 31 on the subject of the desirability of broadcasting information not only on the high cost of taxes themselves but on the high cost of making tax returns, we feel that we should take this occasion to compliment you upon your part in giving this subject publicity.

That such publicity has had its effect is evidenced by the recent attitude of the senate in its consideration of the new revenue bill.

L. C. BLAKE

Advertising manager,
Curtis Pneumatic Machinery Co.,
St. Louis.

Tribute to Patrick J. Moran

To the Editor:

I am writing you . . . in regard to Patrick J. Moran. I might say that Pat was an early associate of mine and I think one of the best friends I had left in the iron and steel business. He died last week and was buried on Friday. (STEEL, April 11, page 31).

On going to Youngstown he tied up with the old Mahoning Valley Iron Co. in Smokey Hollow. When Harry Ruben put together the iron works into what was known as the Republic Iron & Steel Co. of that day, and is the present Republic Steel Corp., he included the Brown-Bonnell works, the Haselton works and the Mahoning Valley works. I might say that Mr. Moran became eventually superintendent of the Hannah furnace and when the new furnaces for the Republic were built at Haselton, which was along about 1906, he had charge of this construction and operation and was highly successful in his duties in this operation.

Later Mr. Alexis W. Thompson, Mr. Edwin N. Ohl and Mr. Walter Rhodes formed the United Iron & Steel Co., and we had the old Cherry Valley furnace at Leetonia, O., and

Patrick J. Moran

also a furnace at West Middlesex, Pa. Mr. Moran was appointed general manager of this company and had charge of all the furnace operations. This he handled very successfully and I think when these passed to the control of the M. A. Hanna Co. he went with them to that company.

Pat Moran was outstanding in what he accomplished, and highly regarded by all of his acquaintances and friends.

CHARLES HART

President,
Delaware River Steel Co.,
Chester, Pa.

Simple Warehouse Plan

To the Editor:

Despite its age and varied uses, the application of field warehousing to inventory financing, is still news.

From our experience in contacting members of your industry we have found a limited understanding of the profitable advantages gained by financing inventory through field warehousing.

Even a majority of country bankers, who might be expected to encourage borrowing through the simple and inexpensive means provided by a field warehouse operation, do not fully appreciate its possibilities.

Your readers will find the knowledge of this practice both timely and helpful.

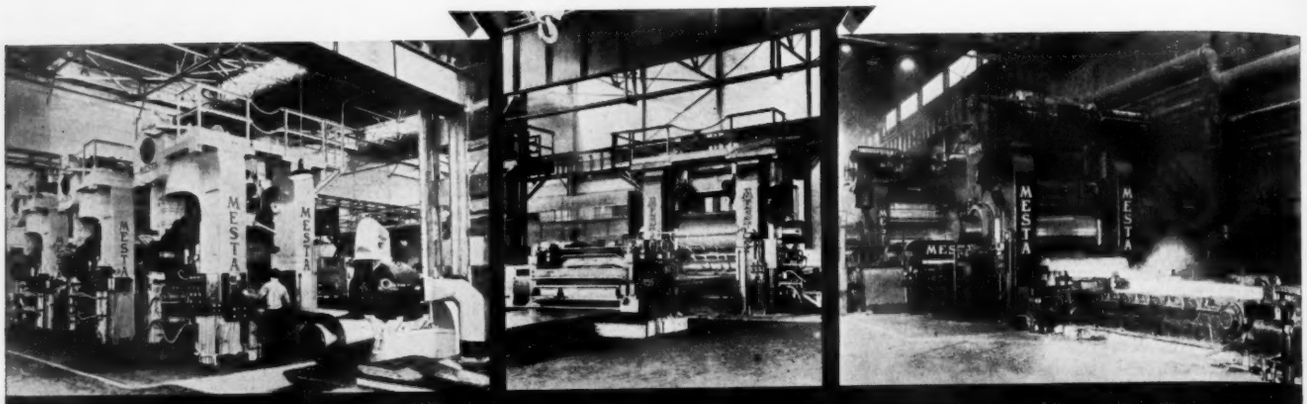
When a manufacturer orders raw material in quantity he usually stores most of it in a public warehouse at the closest point of convenience.

He then proceeds to borrow on the warehouse receipts for the temporary deposit of his materials.

As this material is required for manufacture he must take up the bank loan and then incur the expense of removal from the warehouse, plus the cost of transfer to his own factory. In field warehousing, such purchases are delivered directly to the buyer's field warehouse which has been established on the manufacturer's own property.

Negotiable or non-negotiable warehouse receipts are then issued in the customary manner. When this material is to serve as bank collateral the loaning officer willingly accepts the field warehouse receipt. It is still covering suitable collateral under the same public warehouse trust it would enjoy if the same ma-

(*Please turn to Page* 89)



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STEEL

FOR FORTY-EIGHT YEARS—IRON TRADE REVIEW

Contents

Vol. 102-No. 16 **April 18, 1938**

READER COMMENTS 11
AS THE EDITOR VIEWS THE NEWS 15
NEWS
- European Quarterly Review 17
- Steel Tubes To Support Blast Furnace Foundation 18
- Forecasts More Alloy Steels in Power Plants 18
- Financial News of the Steel Industry 19
- Labor News 19
- Steel Industry's Taxes 42 Per Cent of Net Earnings 20
- Steelworks Operations for the Week 21
- Men of Industry 22
- Obituaries 23
- Meetings 24
- Centrifugal Casting at Ford's Dearborn Plant 25

MIRRORS OF MOTORDOM 27
WINDOWS OF WASHINGTON 31
EDITORIAL—Wasted Billions Put Brakes on Recovery; Pump Priming Results Only in More Taxes 33
THE BUSINESS TREND
- Activity Index Recedes to Mid-March Level 34
- Charts and Statistics 34-35

TECHNICAL
- Making Room Coolers 36
- Effective Program Establishes Safety Record 39
- Second New England Foundry Conference 40
- A.S.T.M. Announces New Committees 63

PROGRESS IN STEELMAKING
- Instrument Control 42

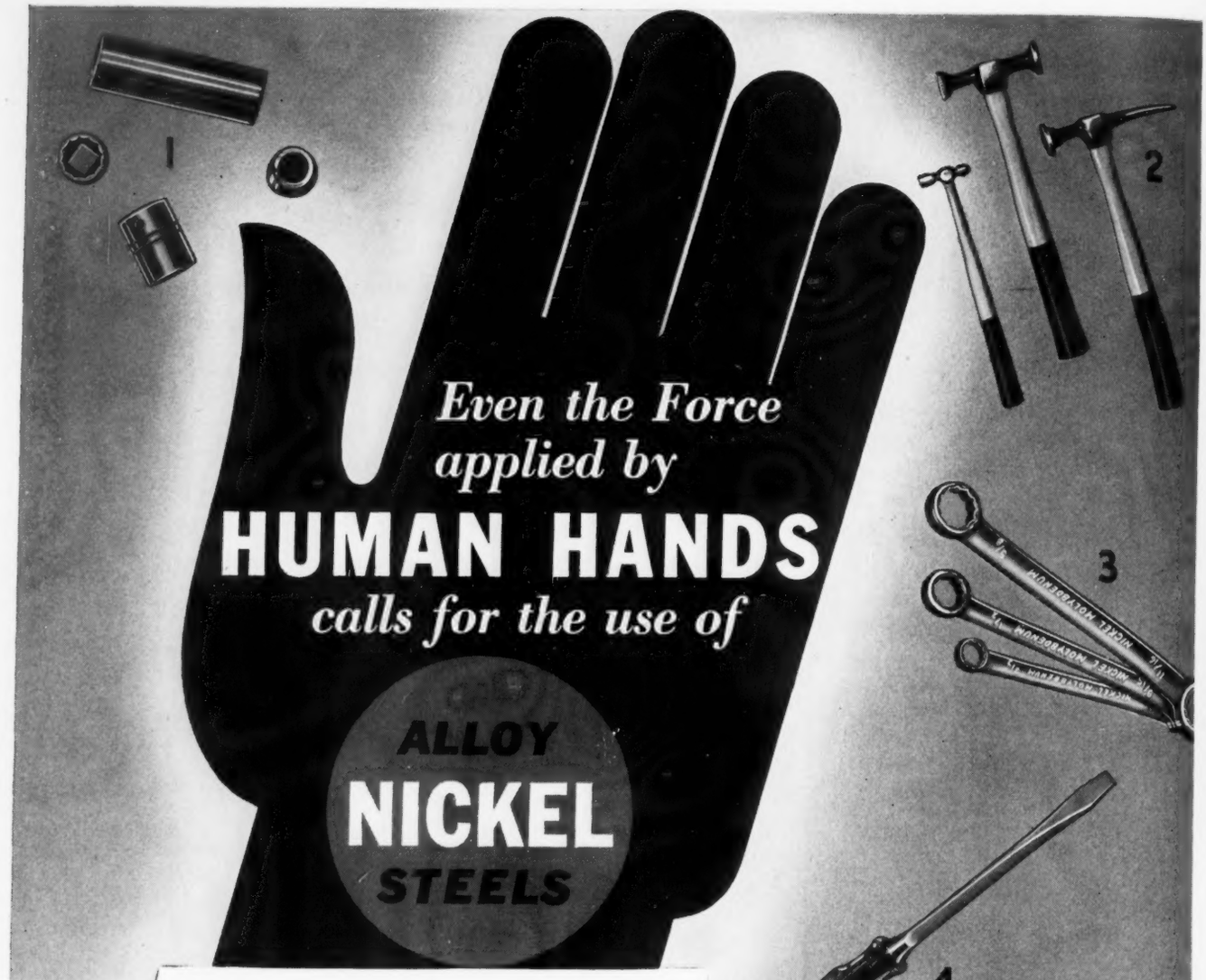
MATERIALS HANDLING
- Wire Rope Specifications 49

NEW METAL PRODUCTS 54
HEAT TREATING
- Gas Carburizing 57

HELPFUL LITERATURE 65
INDUSTRIAL EQUIPMENT 67
MARKET REPORTS AND PRICES 71
- The Market Week 72

BEHIND THE SCENES 80
CONSTRUCTION AND ENTERPRISE 90
INDEX TO ADVERTISERS 96

PRODUCTION · PROCESSING · DISTRIBUTION · USE



Even the Force applied by HUMAN HANDS *calls for the use of*

ALLOY NICKEL STEELS

Economical use of these alloys for hand tools emphasizes their advantages for power equipment parts

Stresses and shocks take their toll even of hand tools. Cutting edges are dulled. Wrenches, pliers, hammers and such tools are damaged. Handles and shanks are broken as a consequence, so industry today is turning more and more to the use of Nickel alloy steels.

Light in weight, hand tools of Nickel alloy steel possess toughness, rugged strength, and excellent heat-treating qualities. They outlast hand tools of other materials many times over. They are more economical to use and maintain, and lower in ultimate cost.

The forces that destroy hand tools also shorten the life of power-operated equipment. Multiplied a hundred-fold, wear, high stresses and heavy shocks are constantly imposed on moving parts. The need for metals that will withstand this punishment is therefore proportionately greater.

The Nickel alloy steels possess in high degree the qualities required. Economical to use for hand tools, they also assure for machinery parts durability and longer life. Consultation on problems involving their application is invited.

1. These wrench sockets, manufactured by Plomb Tool Company, Los Angeles, are made of Nickel-molybdenum steel.

2. Dinging hammers and small ball pean hammers of various types, manufactured by Plomb Tool Company, Los Angeles, are made from Nickel alloy steels.

3. Bridgeport Hardware Company wrenches of S.A.E. 4650 Nickel-molybdenum steel.

4. Nickel alloy steel heavy duty screw driver made by Stanley Tools, New Britain, Conn.

5. Various types of heavy-duty pliers and pincers, manufactured by Wm. Schollhorn Company, New Haven, Conn., from Nickel-chromium steel.

THE INTERNATIONAL NICKEL COMPANY, INC., NEW YORK, N. Y.

As the Editor Views the News

■ INDUSTRY'S eye last week was focused on Washington. Though doubting the wisdom of further huge expenditures which are bound to increase the already crushing tax burden, business men are forced to be realistic. They are observing developments closely with a view to missing no possible chances for the creation of new business. Among many other prospects is one that the navy will ask for $8,000,000 to $10,000,000 (p. 31) for the purchase of needed machine tools. . . . Automobile production (p. 21) moved up again slightly last week to 62,021 cars as compared with 60,975 the week previous. . . . Recent slight upward trend in steel production has come to a halt. Ingot output last week was at 32 per cent of capacity (p. 21), unchanged from the week before.

• • •

Plants Improved

Recent lean years have forced the steel industry to study all possible means of lowering production costs. Operating at only 34 per cent of capacity, said E. G. Grace, president, Bethlehem Steel Corp., at the annual stockholders' meeting last week, that company (p. 19) will show a profit for the first quarter. Bethlehem has spent $332,000,000 on improvements during the past 15 years. Its tax bill in 1937 was equivalent to more than $6 on the common stock. . . . At Republic's annual meeting (p. 19) T. M. Girdler, chairman, was unable to see "a great deal of bright sunshine ahead," but said, "this may change at any time." Mr. Girdler considered steel inventories in some lines as still high. He deplored the current rate of federal spending.

• • •

$169,086,000 In Taxes

Taxes on the steel industry last year (p. 20) exceeded 42 per cent of net earnings. Total taxes, $169,086,000, were equivalent to $330 for each of the industry's 513,000 wage earners. . . . National labor relations board rulings against Republic Steel Corp. and Inland Steel Co. (p. 19) last week were headed for court tests. . . .Plans of leading producers for small, inexpensive automobiles to appeal to those in the low-income bracket (p. 27) appear to have been abandoned because of fears as to sales volume. . . . Total weight of superstructure of a new 1000-ton blast furnace, including 3000-ton concrete pad, is to be 18,000 tons. The 180 piles to support this weight (p. 18) are opened, 16-inch, welded steel tubes, driven to bedrock and filled with concrete.

• • •

Portable Air Conditioners

Air conditioning rapidly is gaining as a consumer of metals. Estimating 1938 sales of portable air conditioners at 35,000 to 40,000 units, one manufacturer (p. 36) has launched production of such units on an assembly line basis . . . . Though other industries have made progress in applying so-called "co-ordinated process control," the steel industry in general continues to use pyrometers and other instruments as indicating agents rather than actual process controllers. An exception (p. 42) is found at one steel plant where instruments have been co-ordinated for control of fuel-air ratio in blast furnace stoves, for control of coke oven pressures and for varying steam supply to turbines driving gas compressors to maintain a constant pressure in the gas line.

• • •

Accidents Reduced

Standard specifications adopted by the Electric Hoist Manufacturers' association (p. 49) cover all details of construction of wire rope electric hoists . . . . Increased emphasis on safety in recent years has led to a remarkable reduction in loss of time due to accidents. One company (p. 39) recently operated over 4,500,000 man-hours without a lost-time accident . . . . Solidification of molten metal can be controlled by temperature gradients governed by size of the casting and by gating or heading. Resulting possibilities (p. 40) deserve careful attention by the castings designer . . . . A new device of steel is available (p. 54) for protection of banks. In event of a holdup the teller, undetected, can deposit his steel cash drawer in a timer-controlled steel safe below.

E. L. Shaner

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France Experiencing Worst Industrial Crisis; Recession in Great Britain

BY VINCENT DELPORT
European Manager, STEEL

LONDON

■ A TENSE and distressing atmosphere pervaded Europe halfway through the month of March, when the dictator of Germany wiped independent Austria off the map and forcibly added over 32,000 square miles to German territory and nearly 7,000,000 people to its population.

At the time, France had no government. A few days later, Leon Blum formed a new ministry, and before the end of the month the extremist section of the French popular front almost induced the socialist premier actively to intervene in Spain in favor of the rapidly-retreating forces of the Spanish popular front government.

Thus, in the space of two weeks, war clouds gathered over Europe from two points of the compass. Yet the chances of a cloudburst were remote, owing to the repugnance of a large section of European populations to be involved in another war.

The impressive statement in parliament of the British premier also had the effect of postponing—it is hoped indefinitely—the chances of an impending and general conflagration. The next test will come when the German ruler decides to take action in regard to Czechoslovakia or Hungary.

Germany Gains Ore Supply

It is obvious that such momentous events are bound to bring about consequences, not only of a political, but also of an economic, nature in the relations between the countries of Europe, and that such events are disturbing to trade and industry.

The annexation of Austria to Germany augments the latter country's potential resources in iron ore by about 200,000,000 tons, according to reliable estimates. This ore contains an average of about 30 per cent iron. This is of importance to Germany, which country, since the Lorraine ore beds were returned to France in 1919, has to import about 20 million tons of ore annually at her present rate of consumption.

Austrian output of iron ore in 1937 was 1,800,000 tons in round figures, but the output could be materially increased by intensified methods of extraction. Austria is also the most important producer of magnesite.

As regards steel, Austria's contribution to European production in 1937 was about 650,000 tons, 1937 being a post-war record year. This is relatively small in comparison with Germany's well-nigh 20,000,000 tons capacity. On the other hand, there are in Austria two fairly important plants which can be used entirely for armament work.

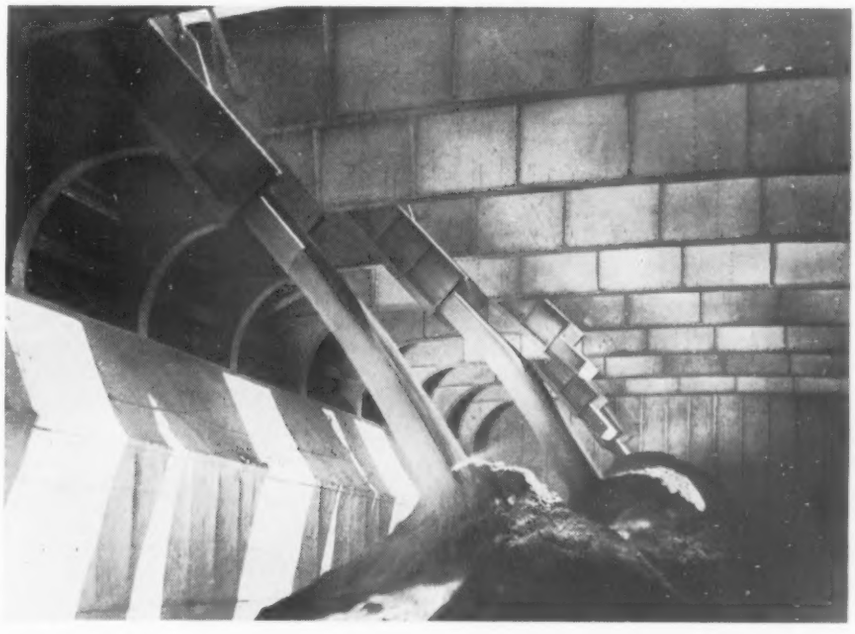
Thus, Germany, already the biggest steel-producing country in Europe, has further increased its mineral wealth and productive capacity, and only Russia may still be considered to be in the running in the output race.

Conditions in the European iron and steel trades, which generally were fairly promising at the beginning of the year, have now materially deteriorated. In Germany, production and domestic trade continue active, but export trade suffered a serious recession in February—a consequence of the general slowing down in steel exports from which European countries alike have been suffering since last fall.

It is in France more particularly that the steel industry has suffered most in recent months. Owing to political strife that has become chronic, the French have lost confidence and the spirit of enterprise.

Fundamentally, the country is

"Man's Servant" in the Making



■ In United States Steel Corp.'s new motion picture, "Steel—Man's Servant," produced with sound and technicolor, is this unusual view of ore pouring into a ship's hold. The new film, showing steelmaking from mines to finished products, was previewed last week at Waldorf-Astoria hotel, New York, hailed as effective, complete, entertaining and instructive

rich in raw materials and agricultural assets, and by the hard-working characteristics of its people, but constant changes in governments, with a consequential lack of continuous planned policies, increasing taxation, restriction of the employer's freedom brought about by the influence gained by the labor federations—all these factors have caused capital to be hoarded and production to shrivel up.

The 40-hour week legislation and the strikes that have occurred almost continuously on account of the alleged misapplication of the new laws, have further curtailed output. Finally, constant fears concerning the actions of agitated neighboring countries have added their disturbing influence to the unfavorable internal factors.

As a result of these conditions, domestic activities are far from sufficient to compensate for the dullness of export trade, and iron and steel production in France is dwindling rapidly. Blast furnaces and steel furnaces are being blown out, and some concerns are beginning to discharge part of their working staff and reduce hours of work.

A disturbing aspect of the situation is that not enough money has been available of late for the state to carry out its program of armament and public works. The financial position of the treasury appears to be one of the weak factors of the whole situation.

Mr. Chautemps resigned because the socialist party would not support him in his plea to obtain extra-parliamentary powers to enable him to redress French finances by decrees. Now Mr. Blum, the

(*Please turn to Page* 24)

Steel Tubes Base for Blast Furnace

■ FOUNDATIONS for a 1000-ton blast furnace built on pipe piling driven to rock were completed recently at the Republic Steel Corp.'s Youngstown, O., plant. The new furnace, replacing the old 500-ton No. 3 blast stack, will be the first, it is reported, ever carried to rock on pipe piling.

Total weight of the super-structure will be 18,000 tons. This includes a 3000-ton reinforcing concrete pad, capping the piles, that is 65 feet wide, 75 feet long and 6 feet thick. Altogether there are 180 piles, all 16-inch outside diameter, ⅜-inch, electric welded open-end tubes. They were driven to rock, cleaned out by means of air and water under pressure, and filled with 1:2:4 concrete.

Borings revealed a layer of quicksand at about a 35-foot depth over a considerable part of the site. A fairly level rock surface was located at a depth of 64 feet.

The old furnace which weighed 10,000 tons was built on 400 to 500 wood piles 25 feet long, driven in 1906. These were badly decayed.

Random lengths of standard pipe, about 40 feet and 25 feet long, were used. The 40-foot length was driven first and the two were fitted together with a New York city standard inside sleeve. More than 11,600 feet of pipe were driven.

Before filling, one of the piles was tested. Although designed to carry a load of 100 tons when filled, this carried a load of over 92 tons empty.

■ **Driving 16-inch open-end steel tubes for the foundation of Republic Steel Corp.'s new 1000-ton blast furnace at Youngstown, O.**

"More Alloy Steel In Power Plants"

■ TWO papers on metallurgical subjects were presented at the Midwest Power conference held in LaSalle hotel, Chicago, April 13-15. The conference was sponsored by the Armour Institute of Technology with the co-operation of Iowa State college, Purdue university, State University of Iowa, and the universities of Illinois, Michigan and Wisconsin, and local and national engineering societies. Registration exceeded 300.

Increasing use of alloy steels in the manufacture of power plant equipment was forecast by A. E. White, director of engineering research, University of Michigan, in a paper on "Metallurgy of Power Plants". Mr. White explained that various parts of power plant equipment will be subject to increasingly higher temperatures, requiring the use of material with higher creep value than that of plain carbon steel.

Use More Carbon Steel

Tracing the development in power plant equipment during the present century, Mr. White described the types of material used in important units of power plant installations. Boilers originally were made of sheet copper, later of cast iron, then wrought iron and bessemer steel and now are made of open-hearth and electric furnace steel. Shells generally are fabricated from open-hearth or electric furnace steel while drums employ carbon or molybdenum steel.

Stoker tuyers, generally made of cast iron, might well employ a non-fusable, non-warping alloy, if such were available, it was pointed out. For superheater tubes, 18-8 metal would be a desirable material if the cost were lower. The trend in selection of material for valve bodies is toward a low alloy steel of the molybdenum, chromium, silicon or nickel type.

Neither hardness nor corrosion resistance alone is a sufficient index of the ability of material to resist erosion, it was stated in a paper by J. P. Magos, in charge of research laboratory, and F. R. Zenton, research engineer, Crane Co., Chicago.

This paper described a method of erosion testing of valve parts by means of impingement by steam. It was found that erosion of various metals is not in direct relation to their hardness values. Stainless steel, for instance, while softer than nitrided steel is practically impervious to steam jet erosion. This condition is attributed to the corrosion resisting properties of stainless steel, and the authors concluded that erosion probably results from both mechanical wear and corrosion.

FINANCIAL

PROFIT FOR FIRST QUARTER INDICATED FOR BETHLEHEM

■ DESPITE an operating rate of only 34 per cent, Bethlehem Steel Corp. will show a profit for the first quarter, Eugene G. Grace, president, told stockholders at their annual meeting in Wilmington, Del., last week.

Business last year was slightly above 1929, and foreign business was the highest in the company's history, he said.

Regular dividends were paid on preferred stock and also $5 per share on common stock, making total dividend payments $23,412,000, against $10,391,000 in 1936. The average rate of operations last year was 77.77 per cent, with the year's low, 29 per cent, in December.

During the year improvements to properties cost $45,048,836 and in the past three years, 1935-1937, $85,609,000. In the last 15 years additions and improvements cost $332,000,000.

Expenditures in recent years, he said, were mainly for facilities for production of lighter steel products, such as wire, tin plate, strip and sheets. The company's rated ingot capacity at the beginning of 1938 was 10,042,000 tons, compared with 9,360,000 tons at the start of 1937.

The wage increase from 72.1 cents in 1936 to 86 cents in 1937 raised payrolls $25,705,000. Under plans for vacations with pay, pensions and relief, $3,629,000 was paid in 1937.

Taxes Tripled Since 1934

In 1934 taxes amounted to $6,123,000; in 1935, $7,511,000; in 1936, $12,033,000; and in 1937, $19,687,000. Mr. Grace pointed out that the tax bill for last year was equivalent to more than $6 per share of Bethlehem common stock.

While more than enough proxies were on hand to approve cancellation of the management stock ownership plan, (STEEL, March 7, p. 30), another meeting will be held April 21 to take action.

This is in line with a suggestion made by Charles M. Schwab, chairman, in a letter to stockholders March 31, at which time it appeared there was some question as to whether the necessary two-thirds representation would be present at the regular meeting.

Mr. Schwab successfully defended his position against a demand from a minority stockholder that he serve either without pay, or with a 10 per cent reduction, if no dividend is earned on common stock in the next quarter.

"I have devoted my life to the Bethlehem Steel Corp.," he said, "and I do not intend to give way to the suggestion of serving without pay."

Enthusiastic applause greeted his remarks, and the minority stockholder withdrew the suggestion.

Mr. Schwab paid a strong tribute to Mr. Grace, saying: "He is the ablest man I ever saw."

All retiring directors were reelected—G. H. Blakeley, C. Austin Buck, C. R. Holton, Mr. Schwab and James H. Ward.

STEEL INVENTORIES STILL "RATHER HIGH", SAYS GIRDLER

T. M. Girdler, chairman, Republic Steel Corp., told stockholders at their annual meeting in Jersey City, N. J., April 13, there is "not a great deal of bright sunshine ahead, but this may change at any time.

"I am not only blue about Republic," said Mr. Girdler, "but I am blue on industry and business generally and also on the rate of federal spending."

He considered steel inventories in some lines still "rather high". The automotive industry has sufficient inventory to build the remainder of its 1938 models. However, he pointed out, work on 1939 models probably will begin in mid-summer, and an appreciable pick-up in steel purchases may start late in the second quarter.

Republic's current operations are at 28 per cent. In the first quarter the rate was a little more than 32 per cent, with indications that the corporation will report a net loss for the period.

While there is hope that some undesirable features of the tax laws will be eliminated, taxes will be an important factor for some time, he said. He pointed out that the social security tax will be higher this year.

LABOR

REPUBLIC, INLAND TO TEST NLRB RULINGS IN COURT

■ NATIONAL labor relations board rulings against Republic Steel Corp. and Inland Steel Co. last week were headed toward court tests.

Inland, which was ordered to bargain with SWOC as exclusive agent for its employes and sign an agreement if one were reached, has notified the board it will not comply with the order, pending a court test.

The board held Republic had violated the Wagner act on eight counts. It ordered, among other things, the company reinstate 5000 strikers with back pay, disestablish employe representation plans, cease practices which would make employes think they were not free to join the CIO.

It also blamed the company for certain acts of violence in connection with the strike last summer, implied the company should forgive and forget outrages by the unionists, reinstate most of the guilty men.

In reply, Tom M. Girdler, Republic chairman, said the company is desirous of re-establishing "all men who had been on strike who were not guilty of violence or illegal acts."

Many men now out of work are those who stayed away from the plant at CIO leaders' insistence after the strike ended and while work still was plentiful, he said. To these, "the board's order is in effect a notice that the strike has been lost and they should go back to work."

The board's statement it does not find the company's refusal to sign a contract with SWOC to be an unfair labor practice was declared by Mr. Girdler to be "complete justification of the stand taken by the company last summer. . . .

Company Evidence Ignored

"The decision of the board as a whole reflects the one-sided character of the Wagner act, under which the board functions and which accounts for the fact that the board in the hearings gave great credence to the testimony attacking the company and seems to have disregarded evidence offered by the company.

"We are convinced the board's decision is wrong that the company must not negotiate with its employes who have formed their own independent labor organizations. They exist today as collective bargaining organizations, representing a major part of the company's employes, and should have as much right to act in that capacity as has any other labor group. The courts will have to decide this question."

Mr. Girdler found it "astounding that the labor board should direct the re-employment of employes who were guilty of violence and who menaced the lives of their fellow workers during the strike."

The two independent labor organizations in Republic plants, claiming almost all the 50,000 production workers now employed, announced they would contest the order and seek a signed agreement recognizing them as exclusive bargaining agents for all employes.

STEELWORKERS EARN $1570 IN 1937; NEW WAGE RECORD

Average annual wage of steelworkers in 1937 was $1570, nearly 70 per cent more than in 1933 and 13 per cent more than in 1936, according to the American Iron and Steel institute.

Both total wages and employment were the highest in history, although output was 10 per cent below 1929.

Taxes on Steel Industry Equal to Year's Pay for 108,000 Wage Earners

■ TAXES on the steel industry last year exceeded $169,086,000, or 42 per cent of net earnings after all other expenses of operation, according to reports from nearly 100 companies representing more than 90 per cent of total steel output, to the American Iron and Steel institute. In 1929 taxes took $103,000,000, less than 19 per cent of net profits.

The 1937 tax bill represents an increase of 65 per cent over 1929, and 60 per cent over 1936.

The total tax last year was equivalent to $330 for each of the industry's 513,000 wage-earning employes, or a year's pay for 108,000 workers. This total represented 15 cents per dollar of payrolls, compared with 12 cents in 1936, and 10 cents in 1929.

Federal government is taking an increasing proportion of the tax dollar. State and local taxes represented 62 per cent of the total in 1929, but only 52 per cent in 1937.

A financial analysis by the institute, covering 98 companies and more than 90 per cent of total output, shows earnings for the industry last year represented a return of about 6.2 per cent on investment.

STEEL'S twelfth annual financial analysis covering 22 leading producers, representing 63,096,820 tons of ingot capacity, or 90 per cent of the country's total, showed a return on investment to those producers of 6.1 per cent. (STEEL, April 11, p. 42).

Aggregate net profits of 98 companies covered in the institute's survey amounted to $231,794,000, after all charges before dividends. In 1936 total earnings of the same companies amounted to $156,526,000. Return on investment in 1936 was 4.6 per cent.

Earnings Behind Production

Although return on investment was highest since 1929, when 10.5 per cent was earned, earnings have failed to keep pace with production. Total output of finished steel in 1937 was only 10.5 per cent below the record tonnage in 1929, but the per cent return on investment in 1937 was only a little more than half the 1929 return.

Total payrolls, including those of some subsidiaries which do not produce iron and steel products, were $1,124,445,000, an increase of 28 per cent over the 1936 total, $881,801,000. The increase of $242,000,000 in payrolls was more than three times the increase in aggregate net earnings.

Dividends paid to the 493,900 stockholders in 1937 amounted to $151,145,000, equivalent to only 5.7 per cent on the $2,661,130,000 which stockholders invested in common and preferred stocks. In 1936, 450,000 stockholders received $108,799,000, a little more than 4 per cent on investment.

The industry's total investment increased about 3 per cent during 1937, reaching a total of $4,349,800,000 at the close of the year. Value of stocks outstanding increased $101,500,000. Funded debt decreased $29,000,000. Contingent and insurance reserves increased $7,600,000 to a total of $137,300,000. Surplus, less deferred charges, rose $57,400,000 to $842,800,000.

Holdings of cash and marketable securities decreased $62,400,000, amounting to $258,900,000 at the end of 1937. Inventories value rose approximately $130,000,000. Net property value of the 98 companies at the end of the year was $3,244,500,000, an increase of more than $130,000,000.

In comparison to the slightly more than 6 per cent return on investment in the steel industry, as disclosed by the institute's and STEEL'S surveys, the National City Bank of New York reports the following returns for other industries in 1937:

Industry	Per cent return
Agricultural implements	13.0
Automobiles	19.9
Auto accessories	16.7
Construction	4.5
Hardware and tools	14.8
Heating and plumbing	10.2
Machinery	15.8
Petroleum	10.5
Railway equipment	7.5

Stainless Steel Plane "Sound" After 6 Years

■ **Six years' exposure to various atmospheric conditions has failed to wear or deteriorate structural parts or welds of the Pioneer, first stainless steel airplane. Built by Edward G. Budd Mfg. Co., the plane was flown under all sorts of conditions for three years. For the past three years, it has been standing, stripped of all fabric, in front of Franklin institute, Philadelphia. Recently it was dismantled and inspected, found in perfect structural condition**

Industry Over-Produced In 1937, Roosevelt Says

■ President Roosevelt in his message to congress last week asking for $4,500,000,000 for relief and public works to meet the business depression picked out the steel, automobile, copper and textile industries by name as having over-produced in 1937.

"Production in many important lines of goods outran the ability of the public to purchase them," he said. "For example, automobile manufacturers not only turned out a normal increase of finished cars, but encouraged the normal increase to run into abnormal figures, using every method to push their sales. This meant, of course, that the steel mills of the nation ran on a twenty-four hour basis."

Speaking of the price situation during this period, the President said "the price of steel products of many kinds was increased far more than was justified by increased wages."

March Machine Tool Orders Up 41 Per Cent

■ Foreign machine tool orders in March were more than double those of February, and domestic orders increased slightly, according to National Machine Tool Builders' association, Cleveland.

The association's index for March stands at 107, an increase of 41 per cent over February. Foreign orders index rose to 56.5 from 27, and for March represents 52 per cent of the total. Domestic orders index gained from 48.7 to 50.5.

Average index for the first three months of 1938 was 100.4, compared with 140.8 in the final quarter of 1937.

Malleable Iron Output Highest Since 1929

■ Production of malleable iron castings in the United States in 1937 totaled about 688,000 tons, largest since 1929, according to the Malleable Founders' society, Cleveland.

Operations averaged 61.5 per cent of capacity. Automotive manufacture absorbed 54 per cent of the tonnage, railroads 8 per cent, and miscellaneous 38 per cent.

Petroleum Institute's Members Visit J & L Mill

■ Modern methods of producing seamless casing and drill pipe were shown to 125 members and guests of the eastern division, American Petroleum institute, April 13, at Jones & Laughlin Steel Corp.'s Aliquippa mill.

The inspection trip was incidental to the institute's eastern regional meeting at Hotel William Penn. Of special interest at the mill was the upsetting process and the numerous testing operations performed on the recently perfected integral joint drill pipe manufactured by Jones & Laughlin.

Start Welded Steel-Frame Apartment in New York

■ First all-welded steel-frame multi-story structure to be erected under New York's new building code is under way at Seventh avenue and Twentieth street, Manhattan. Planned by H. A. Hyman, civil engineer, it will be a 14-story apartment building, to be known as Kensington House.

Original structural design for riveted fabrication, made by Ball & Snyder, engineers, was changed to provide for welded construction. Gilbert D. Fish, consulting engineer and chairman of the American Welding society's building code committee, redesigned all connections for welding.

Welding is performed by the electric arc process, each operator using a welding generator, manufactured by Wilson Welder & Metals Co. Inc., New York.

Lehigh Construction Co. has the contract for steel erection and welding. Gulick and Henderson, engineers, have been retained to inspect both shop and field welding in accordance with the building code.

District Steel Rates

Percentage of Open-Hearth Ingot Capacity Engaged in Leading Districts

	Week ended April 16	Change	Same week 1937	Same week 1936
Pittsburgh	30	+ 1	95	65
Chicago	30	− 1	84	70.5
Eastern Pa.	28	None	59.5	43.5
Youngstown	31	— 2	86	80
Wheeling	31	— 2	96	84
Cleveland	23	— 4	76.5	84.5
Buffalo	28	None	90	65
Birmingham	66	None	80	69
New England	30	+10	97	78
Cincinnati	18	—27	86	80
St. Louis	42.4	None	82	†
Detroit	18	None	100	100
Average	32	None	91.5	70.5

†Not reported.

Buffalo Sells Civil War Relics as Scrap

■ Five Civil war cannon, each weighing 6700 pounds, and 200 cannonballs which for many years have been displayed in Buffalo's parks were put on the auction block last week and sold as scrap. Nine dealers bid. Best price was $7 per ton for the cannon, and $9 for the cannonballs.

Welding Wire Output Up

■ Production of steel welding wire last year amounted to 155,310,000 pounds, a gain of 10 per cent over 1936, according to the American Iron and Steel institute.

U. S. STEEL CORP. SHIPMENTS
(Inter-company shipments not included)
(Tons)

	1938	1937	1936	1935
Jan.	518,322	1,149,918	721,414	534,055
Feb.	474,723	1,133,724	676,315	583,137
Mar.	572,199	1,414,399	783,552	668,056
3 mo.	1,565,244	3,698,041	2,181,281	1,785,248
April		1,343,644	979,907	591,728
May		1,304,039	984,097	598,915
June		1,268,550	886,065	578,108
July		1,186,752	950,851	547,794
Aug.		1,107,858	923,703	624,497
Sept.		1,047,962	961,803	614,933
Oct.		792,310	1,007,417	686,741
Nov.		587,241	882,643	681,830
Dec.		489,070	1,067,365	661,515
Y'rly adj.			†40,859	†23,750
Total		12,825,467	10,784,273	7,347,549

†Deduction.

PRODUCTION

■ WITH a slight increase in the Pittsburgh and New England districts and some slackening in several others the national steelworks operating rate last week remained at 32 per cent. Some indications point to a lower rate this week.

St. Louis—Held at 42.4 per cent for the second consecutive week.

Birmingham, Ala.—Unchanged at 66 per cent.

Central eastern seaboard—Steady at 28 per cent, with no indication of change soon.

Chicago—Declined 1 point to 30 per cent. One important interest increased activity but this was overbalanced by contraction elsewhere.

Pittsburgh—Slight upward revision by large producers raised the rate 1 point, to 30 per cent.

Wheeling—Curtailment by one producer reduced the rate 2 points to 31 per cent.

Cincinnati—Off 27 points to 18 per cent.

Detroit—Unchanged at 18 per cent. Heat has been turned off on producers' open hearths after being idle three weeks, indicating immediate resumption is not planned.

Buffalo—For the second week the rate is steady at 28 per cent, with little indication of change.

Youngstown—Down 2 points to 31 per cent. Further recession of 2 points is expected this week.

New England—All steelworks are producing ingots, although at a minimum. Operations were up 10 points to 30 per cent.

Cleveland—Down 4 points to 23 per cent.

U. S. Steel Shipments Increase in March

■ Shipments of finished steel by the United States Steel Corp. in March were 572,199 tons, a gain of 97,476 tons or 20.5 per cent over those of February. Compared with March, 1937, there was a decrease of 842,200 tons or 59.4 per cent. First quarter shipments totaled 1,565,244 tons, compared with 3,698,041 tons in the same period of 1937, a decline of 2,132,797 tons, 57.2 per cent.

Auto Production Rising

■ Automobile production for the week ended April 16 totaled 62,021 cars, 1046 more units than in the previous week, according to *Ward's Reports*. Comparisons:

	Week ended April 16	Week ended April 9
General Motors	23,620	22,430
Chrysler	13,775	14,075
Ford	16,135	15,885
All others	8,491	8,585

Monthly and yearly comparisons will be found on page 28.

MEN OF INDUSTRY

■ RALPH KELLY, a vice president of Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has been placed in charge of sales, with headquarters in the Pittsburgh executive offices. Formerly he was in charge of the Pittsburgh district works, including the plant at East Pittsburgh.

Other vice presidents who have been assigned new duties in a revised schedule of responsibilities are: R. B. Mildon, formerly in charge of the steam and stoker departments at the South Philadelphia works, who has assumed management of the East Pittsburgh division, and N. G. Symonds, long associated with sales operations, who will now devote his time in the sales department to specific customer activities, association work and special duties.

Roy A. McCarty, formerly manager of the small motor division at Lima, O., has been transferred to South Philadelphia as manager of the steam and stoker division, and B. H. Lytle, formerly a division manager in East Pittsburgh, goes to Lima as manager.

♦

P. C. Regan has been appointed general manager of sales, Andrews Steel Co., Newport, Ky.

♦

Sir Robert A. Hadfield, noted English steelmaster, has been awarded the Trasenster medal and diploma for 1938 by the Association des Ingenieurs de Liege.

♦

H. E. Lewis, chairman and president, Jones & Laughlin Steel Corp., Pittsburgh, has been elected to the board of directors, American Iron and Steel institute, New York.

♦

Stephen P. Hackley has resigned as sales manager of the Belknap Mfg. Co., Bridgeport, Conn., to become sales manager of Bridgeport Rolling Mills Co.

♦

John J. Murray has been appointed eastern representative for the Farrell-Cheek Steel Co., Sandusky, O. His office is at 50 Church street, New York.

♦

J. F. Allen has been elected a director, American Laundry Machinery Co., Cincinnati, and in addition to his duties as assistant secretary, he has also been made treasurer.

♦

Fred P. McBerty has retired from active service as executive manager, Federal Machine & Welder Co., Warren, O., of which he was founder. He will remain chairman of the board.

Ralph Kelly

R. B. Mildon

N. G. Symonds

♦

Axel Malm has resigned as vice president, Wetherill Engineering Co., Conshohocken, Pa., to become identified with the Norristown Foundry Co., Conshohocken, in engineering, design and sales activities.

♦

V. A. Dodds, affiliated with Brown-Wales Co., Boston, for a number of years, has been elected vice president in charge of sales. John G. Fowler has been named vice president in charge of the Lewiston, Me., branch.

♦

T. J. Gerwig, associated with Republic Steel Corp., Cleveland, for a number of years, in a sales capacity at Richmond, Va., Baltimore and Philadelphia, has been named assistant district manager of sales at Philadelphia.

♦

A. F. Southwick, for the past seven years purchasing agent, Erie Bolt & Nut Co., Erie, Pa., has joined the company's sales organization as Ohio sales manager. J. B. Taft succeeds Mr. Southwick as purchasing agent.

♦

Harold C. Hickock has been named district manager, Westinghouse Electric Elevator Co., Pittsburgh. He formerly was identified with the sales division in Jersey City, N. J. William H. Patterson, former manager at Pittsburgh, has been transferred to Jersey City.

♦

J. P. Price, vice president in charge of manufacturing, Mullins Mfg. Co., Salem, O., has resigned. He is succeeded by Howard Kulas, formerly associated with Midland Steel Products Co., Cleveland. Mr. Kulas is a nephew of E. J. Kulas, president of the Midland company and the Otis Steel Co.

♦

Donald P. Hess has been elected president and a director, United American Bosch Corp.. Springfield, Mass. Mr. Hess resigned as executive assistant to the president of Timken Roller Bearing Co., Canton, O., in March, 1936, after 17 years association with that company, to become vice president and director of the Ebco Mfg. Co., Columbus, O.

♦

Fred Egglestone, formerly New England district sales manager for Youngstown Sheet & Tube Co., is now representing the Wrought Iron Co., Lebanon, Pa., for steel rounds, squares, flats, angles, channels and rivets. His headquarters are at Waban, Mass., P. O. box 16.

E. M. Joesam Co., Boston, will represent the company in the sale of machine, carriage and lag bolts, hot and cold pressed nuts, soft steel rivets, spikes, etc.

♦

Walter J. Auburn, purchasing agent, Gerrard Co. Inc., Chicago, has been appointed editor of *The Chicago Purchaser*. Educated in the University of Cincinnati and Northwestern university, his initial ex-

perience in the purchasing field was with Proctor & Gamble Co., Cincinnati. Before going with the Gerrard company in 1931, he was office manager, Griess-Pfleger Tanning Co., Chicago, for about 11 years.

♦

J. F. Cooke, electric hoist sales manager, American Engineering Co., Philadelphia, has been elected chairman, Electric Hoist Manufacturers association, New York. He succeeds S. Buckley, of Shepard Niles Crane & Hoist Corp. W. W. Peattie, president, Northern Engineering Works, Detroit, has been elected vice chairman of the association.

♦

George Gibbs, Gibbs Steel Co., has been elected president, Milwaukee chapter, American Steel Warehouse association. Other officers are: Vice president and national director, L. R. Moise, Moise Steel Co.; secretary-treasurer, George W. Smith, Joseph T. Ryerson & Son Inc.

♦

W. B. McLain and Frank T. Birmingham have been added to the sales staff of Buffalo Bolt Co., North Tonawanda, N. Y. Mr. McLain, active in sales work in the Detroit area for many years, will contact the automotive trade, while Mr. Birmingham will contact a number of important consuming lines in the Middle West.

♦

Norton T. Jones, who joined the Van Dorn Iron Works Co., Cleveland, in February, as executive vice president, has been elected president. He succeeds F. G. Smith, who has been made chairman of the board.

Other officers elected include: Vice president, Fred D. Sadler; treasurer, A. E. Fox; assistant treasurer, P. J. Christmann; controller, John M. Marshall; secretary, J. A. Boyden; assistant secretary, J. T. Van Dorn.

♦

S. E. Bergstrom, Detroit district sales manager for Cincinnati Milling Machine Co. and Cincinnati Grinders Inc., has been appointed assistant general sales manager at Cincinnati.

F. M. Gertiser succeeds Mr. Bergstrom in charge of the Detroit office, New Center building. P. D. Gasnier, sales engineer, has been transferred to Detroit from Cincinnati. C. F. Stuemer handles sales and service in the Detroit office.

♦

C. W. Trust has been named traffic manager, eastern district, Pittsburgh, of the consolidated traffic department of the United States Steel Corp. subsidiaries. He succeeds W. S. Guy, recently appointed acting general traffic manager of the consolidated traffic department. Other appointments are as follows: A. C. Schweitzer, as assistant traffic manager, eastern district; M. N. Billings, traffic manager, western district,

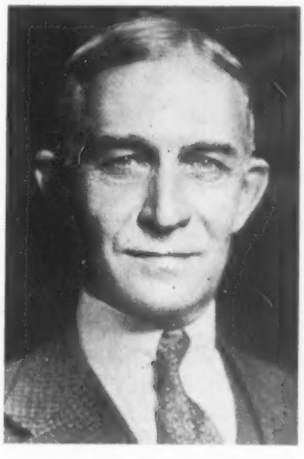
L. W. Martin

Whose appointment as district sales manager at St. Louis for American Car & Foundry Co., was noted in STEEL, April 4, page 31

Chicago; J. W. Hoover, assistant traffic manager, western district; H. M. Knobel, traffic manager, Cleveland district; R. H. Haley, traffic manager, New England district, Worcester, Mass. Represented in the consolidated department are American Bridge Co., American Steel & Wire Co., Carnegie-Illinois Steel Corp., H. C. Frick Coke Co., National Tube Co., and United States Coal & Coke Co.

♦

Curtis S. Garner, heretofore general manager of erection, American Bridge Co., Pittsburgh, has been elected a director and vice president. In addition to his new duties he will continue in full charge of erecting operations. Mr. Garner has been identified with the steel fabricating industry since 1895, his service record with American Bridge



Curtis S. Garner

dating from this time when he entered the employ of Milwaukee Bridge & Iron Works, later merged with the Bridge company. His subsequent activities included assignments in the engineering, operating and contracting departments.

DIED:

■ JAMES L. SANFORD, 40, associated with the By-Products Steel Corp., Coatesville, Pa., in an engineering sales capacity at New York and Philadelphia, in New Brunswick, N. J., April 6.

♦

Edward H. Matthews, secretary-treasurer, Smith-Matthews Foundry Co., Detroit, in that city, April 5.

♦

Edwin A. Brummer, 39, for the last ten years assistant production manager, Cleveland Steel Products Co., Cleveland, in that city, April 10.

♦

G. E. Buchanan, 68, a founder of the Appleton, Wis., Wire Works, manufacturer of wire cloth for paper mills, in that city, April 9.

♦

Adolph F. Becker, 71, a former superintendent, Diehl Mfg. Co., Elizabeth, N. J., maker of electrical motors, April 5 in Hartford, Conn.

♦

Jeremiah Bingham, 69, president and treasurer, Toledo Stamping & Engineering Co., Toledo, O., in Miami, Fla., March 29.

♦

Erle J. Byerlein, 46, president, Milwaukee Foundry Equipment Co., Milwaukee, March 30 at his citrus ranch in Progreso, Tex.

♦

Harry Hadelman, 60, president, North Shore Iron & Metal Works, Waukegan, Ill., in that city, March 29.

♦

Thomas J. Usher, 75, vice president, Russell & Erwin Hardware Mfg. Co., Chicago, in that city, March 25.

♦

Louis B. Wallace, for many years treasurer and general manager, Standard Rivet Co., South Boston, Mass., in Wakefield, Mass., recently.

♦

Lionel D. Whitehead, 60, chairman and managing director, Whitehead Iron & Steel Co. Ltd., England, April 3.

♦

Samuel H. Poster, 48, assistant superintendent, Lockhart Iron & Steel Co., Pittsburgh, at his home in Pittsburgh, recently.

♦

Joseph Peyser, 51, inventor and manufacturer of machinery used in the canning industry, in Mt. Vernon, N. Y., April 4. He was president, Peyser-Hansen Machine Co., Mt. Vernon.

♦

Joseph M. Hottell, vice president and secretary, Delta File Works, Philadelphia, and a former president, American Supply and Machinery Manufacturers' association, in that city, recently.

MEETINGS

A. S. M. E. ARRANGES ANNUAL MACHINE SHOP MEETING

■ SESSIONS on gears and machine tools, foundry metals, and methods, and several plant visitations, will feature the annual meeting of the machine shop practice division of the American Society of Mechanical Engineers at the Sagamore hotel, Rochester, N. Y., May 10-12.

Papers to be presented at the opening session are: "A New Method of Producing Machine Screw Products," by E. W. Brinkman, Davenport Machine Tool Co., Rochester; and "Industrial Applications of Spiral, Bevel and Hypoid Gears," by A. H. Candee, Gleason Works, Rochester. Carl L. Bausch, Bausch & Lomb Optical Co., Rochester, will address an evening session on "Inspection Procedure."

Three papers are scheduled for the foundry metals session on the morning of May 11 as follows: "Steel Castings," by F. A. Lorenz Jr., American Steel Foundries, Chicago; "Gray Iron Castings," by A. C. Denison, Fulton Foundry & Machine Co. Inc., Cleveland; and "Malleable Iron Castings," by E. Touceda and J. H. Lansing, Malleable Founders' society, Cleveland. George B. Heddendorf, International Business Machines Corp., will speak at the evening dinner meeting on "Apprentice Training."

The concluding session morning of May 12 includes the following papers: "Trends in Shop Practice and Drafting," by W. L. Bond, General Electric Co., Schenectady, N. Y.; and "What's New in Electrical Equipment for Manufacturing Operations," by W. D. Turnbull, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Afternoon will be spent visiting plants of the following companies: Gleason Works, Bausch & Lomb Optical Co., American Laundry Machinery Co., Eastman Kodak Co., Taylor Instrument Co., Symington Co., Consolidated Machine Tool Corp.

PURCHASING AGENTS WILL STUDY BUSINESS PROBLEMS

Among topics and speakers for the twenty-third annual convention of the National Association of Purchasing Agents, Hotel Jefferson, St. Louis, May 23-26, are the following: "Where Business and Government Meet," by Raymond Moley; "Position of Government and Industry in the Field of Business Practices," by Howard Coonley, chairman of board, Walworth Co.; "What Government Expects of Business," by Warren Bishop, Washington commentator; "Legal Aspects of Federal and State Regulations on Purchasing," by C. M. Updegraff, associate counsel, National Association of Manufacturers; "Recent Chemical Developments and Their Effect on Business," by Dr. H. E. Howe, editor, *Industrial and Engineering Chemistry;* and "Effect of Recent Developments in Mechanical and Metallurgical Research," by Dr. A. A. Bates, research engineering staff, Westinghouse Electric & Mfg. Co.

More than 70 companies, including a number in the metals industry, will exhibit in the Informashow to be held during the convention.

THREE OHIO A. S. M. GROUPS TO CONVENE IN DAYTON

Cincinnati, Columbus and Dayton, O., chapters of the American Society for Metals, will hold their annual tri-chapter meeting at the Engineers' club, Dayton, O., April 27. Papers to be presented will deal with "Corrosion." F. M. Reiter, Dayton Power & Light Co., Dayton, O., is secretary of the Dayton chapter.

METAL TRADES CONVENTION IN NEW YORK, MAY 25-26

National Metal Trades association will hold its fortieth annual convention in Biltmore hotel, New York, May 25-26. Industrial relations problems will be discussed. Harry S. Flynn, Peoples Gas building, Chicago, is secretary.

Convention Calendar

April 27—American Society for Metals. Annual tri-chapter meeting of Cincinnati, Columbus and Dayton chapters at Engineers' club, Dayton, O. F. M. Reiter, Dayton Power & Light Co., Dayton, O., is secretary, Dayton chapter.

May 2-5—Chamber of Commerce of the United States. Twenty-sixth annual meeting in Washington. D. A. Skinner, 1615 H street N.W., Washington, is secretary.

May 2-6—American Mining congress. Fifteenth annual coal mining convention and exposition at Music Hall, Cincinnati. Julian D. Conover, 309 Munsey building, Washington, is secretary.

May 3-4 — American Steel Warehouse association. Twenty-ninth annual convention at Waldorf-Astoria hotel, New York. Walter S. Doxsey, 422 Terminal Tower, Cleveland, is executive secretary.

May 4-6—British Iron and Steel institute. Annual meeting at Institution of Civil Engineers, London. K. Headlam-Morley, 28 Victoria street, London, S. W. 1., is secretary.

May 9-11—American Supply and Machinery Manufacturers' association. Annual convention at William Penn hotel, Pittsburgh. R. Kennedy Hanson, 1108 Clark building, Pittsburgh, is secretary-manager.

May 9-11 — National Supply and Machinery Distributors' association. Annual convention at William Penn hotel, Pittsburgh. H. R. Rinehart, 505 Arch street, Philadelphia, is secretary.

May 9-11—Southern Supply and Machinery Distributors' association. Annual convention at William Penn hotel, Pittsburgh. Alvin M. Smith, Smith-Courtney Co., Richmond, Va., is secretary.

May 10-12—American Society of Mechanical Engineers. Machine shop practice meeting at Hotel Sagamore, Rochester, N. Y. C. E. Davies, 29 West Thirty-ninth street, New York, is secretary.

May 14-19 — American Foundrymen's association. Forty-second annual convention and exposition at Public Auditorium, Cleveland. Dan M. Avey, 222 West Adams street, Chicago, is secretary.

May 16-17—National Association of Sheet Metal Distributors. Annual spring meeting at Hotel Cleveland, Cleveland. George A. Fernley, 505 Arch street, Philadelphia, is secretary.

May 20-21—American Society for Metals. Third biennial Pennsylvania interchapter meeting at Nittany Lion Inn, State College, Pa. D. F. McFarland, Pennsylvania State college, State College, Pa., is secretary of the Penn State group.

May 23-24 — Associated Machine Tool Dealers of America. Spring meeting at Dearborn Inn, Dearborn, Mich. Thomas A. Fernley Jr., 505 Arch street, Philadelphia, is executive secretary.

May 23-26—National Association of Purchasing Agents. Twenty-third annual convention and informashow at Hotel Jefferson, St. Louis. George A. Renard, 11 Park place, New York, is secretary.

May 26—American Iron and Steel institute. Forty-seventh general meeting at Waldorf-Astoria hotel, New York. Walter S. Tower, 350 Fifth avenue, New York, is executive secretary.

European Situation

(*Continued from Page* 18)

socialist minister, is forced to have recourse to the same request, and will probably meet the same fate. In the meantime, the necessary financial laws are not being passed, and monetary resources are dwindling at the same pace as confidence among taxpayers and thrifty owners.

A further reason is advanced in certain quarters as part explanation of the restricted demand for steel. It is claimed that the comptoir authorities have fixed domestic prices at too high a level, even taking into account the increased cost of production resulting from the application of the new social laws and from the rise in the cost of raw materials. As a consequence, consumers restrict their buying to the bare necessities, and business extension and development is put off to an indefinite future.

It can be said that France, at the present moment, is probably experiencing one of the worst industrial crises since the war. However, past history has shown that the French, as a people, have powerful reserves of energy and resiliency, and that they can unite in face of a major crisis, especially if the safety of the country is at stake. Sooner or later, therefore, the country will wake up, but it is sad to think that recent emergencies apparently were not of sufficient mag-

nitude to bring about the required team spirit.

Of the countries of Europe, Great Britain still appears to be the most prosperous. There is no doubt, however, that a recession has set in, at least in certain normal trade channels, since the end of last year. Iron and steel production certainly continues at a high level, but a good proportion of the output is required to catch up deliveries on orders that accumulated during the latter part of 1937.

On the other hand, new business, particularly forward contracts, is not at the same high level as last year, and, in fact, stocks of pig iron and semifinished steel are reported to be accumulating at the producing works.

The most active field, apart from armaments, is in constructional work, largely for plant expansion, indicating, after all, a certain amount of optimism as regards the future, although the armament program requires adequate plants to be ready for an emergency.

One important field which appears to have slackened considerably is the manufacture of automobiles. However, the period between the October motor show and the end of the winter is the most apt to be slack.

Armaments have been mentioned in the previous paragraph, and while they are only a contributory cause of industrial activity in Britain, they constitute by no means an unimportant factor. At the annual general meeting of Thos. Firth & John Brown, one of the leading steel concerns in Great Britain, the chairman stated that in 1937, 16½ per cent of total sales represented the value of sales to the government—namely, armor plates, and shell and torpedo air vessels.

British Outlook Favorable

This figure is a high percentage for direct armament production, but the concern mentioned is one of those particularly well fitted for that type of work. However, taking into account guns and ammunition, warships and aircraft, and indirect manufactures such as special machine tools, plant extension, etc., it can be roughly estimated that at the present rate of intensified armament requirements, from two to three million tons of British steel production is, directly or indirectly, for the defense program.

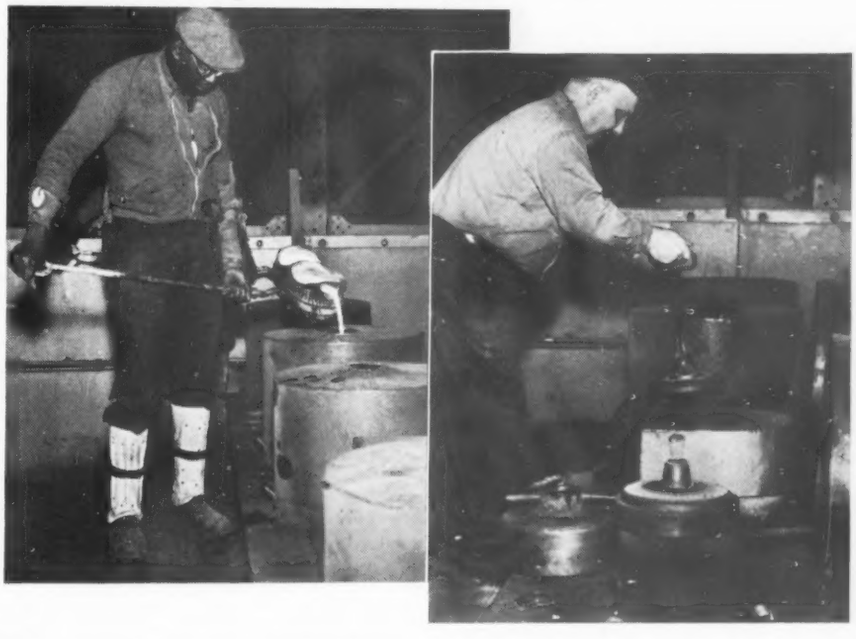
It must be realized that while all these armament contracts help to provide employment and stimulate production, they interfere with normal industry, since some of these armament orders must take precedence over private business, and call for a substantial proportion of raw and semifinished material. In conclusion, while ordinary business conditions are not so much in the nature of a boom as they were a year ago, the outlook for British trade and industry is not unfavorable, and optimism is justified, provided it be tempered by a frank consideration of realities.

International steel trade during the first part of the year has been distinctly sluggish. The international steel entente has been riding heavy seas for some time. Owing to strong American competition in some export markets, particularly in the Far East and in South America, Continental works have freely offered discounts on entente fixed prices and, to some extent, these discounts have been officially authorized.

The situation became such that negotiations were started and conducted between representatives of the European steel entente and representatives of the leading American steel interests, and it is hoped that an arrangement will soon be arrived at. In the meantime, a *modus vivendi* has been agreed upon, and entente minimum quotations are now made compulsory under heavy penalties.

It so happens that the European steel entente arrives this year at its term of expiration, on June 30. Normally it would be renewed without difficulty, but the new factors brought in by American competition and by the annexation of Austria to Germany have created new problems that will take some time to consider and solve. Furthermore, the Belgian steel association, "Cosibel," has to meet the claims of certain concerns for a bigger quota because they have increased their capacity of production. Thus, the reorganization of the entente means much more than a renewal on the existing basis. The result is likely to be a provisional prorogation of the existing entente until these difficulties have been surmounted. There is no doubt that there is a general desire for the continuation and expansion of the entente.

Centrifugal Casting at Ford's Dearborn Plant



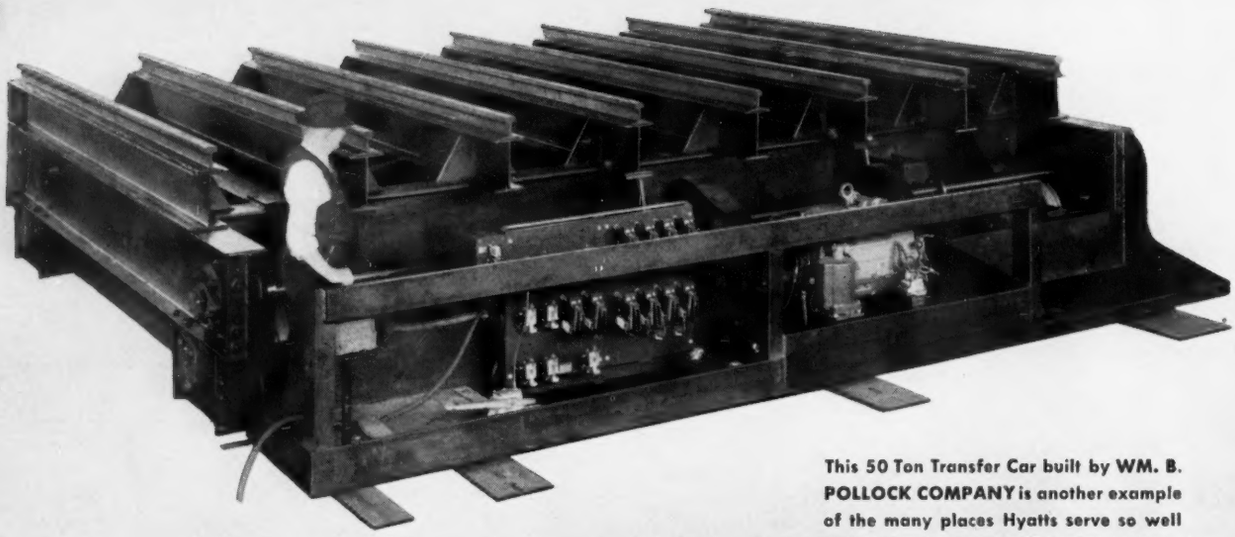
■ In recent months metallurgists of the Ford Motor Co., Dearborn, Mich., have been developing new ideas in centrifugal casting of molten iron and steel, producing ring gear blanks and transmission gear blanks by this method experimentally with good success. A lighter and stronger gear is claimed for the centrifugal process. The technique is not new to foundrymen, one notable exponent of the process being Campbell, Wyant & Cannon Co., Muskegon, Mich.

At the left a workman is pouring molten steel into one of the experimental centrifugal molds at the Ford plant. The molds revolve under heavy protective covers. At the right, a ring gear blank is being removed from the mold.

About three minutes time is required to produce the blank, the mold being spun at a rate of 600 revolutions per minute for the ring gear, and 800 revolutions per minute for the transmission cluster gear.

The experimental work now under way at Ford presages the extension of the process to a number of other parts, with the possibility of producing even cast steel connecting rods by this method.

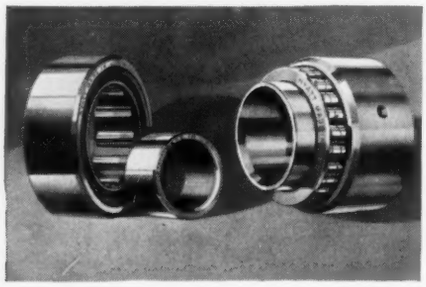
WHERE *Performance* COUNTS...



This 50 Ton Transfer Car built by WM. B. POLLOCK COMPANY is another example of the many places Hyatts serve so well and so long in steel mill equipment.

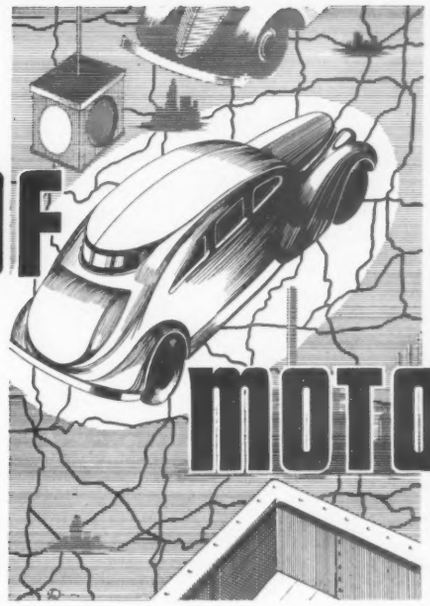
COUNT ON HYATT

HYATT performance writes an indelible story. Performance expressed in extremes . . . load extremes, time extremes, economy extremes. Made of sturdy stock, and tough to the core, each Hyatt race and roller is steeled to meet the most exacting conditions of operation. Nowhere else in the world is steel so carefully selected to do a specific job, and so carefully controlled in manufacture, as in the Hyatt plant at Harrison, New Jersey. That's why most of the mechanical equipment operating in the steel mill is today more efficient, more dependable, more economical, and much longer-lived because Hyatt Roller Bearings are written into design and specifications wherever endurance and economy are factors. Therefore, consider Hyatt performance before you write *your* specifications. Hyatt Bearings Division, General Motors Corporation, Harrison, Detroit, San Francisco. Hyatt Roller Bearing Sales Company, Chicago and Pittsburgh.



HYATT ROLLER BEARINGS

MIRRORS OF MOTORDOM



BY A. H. ALLEN
Detroit Editor, STEEL

DETROIT

■ INQUIRY on the status of small-car developments undertaken by leading producers a while back reveals most of these projects are currently dormant if not altogether abandoned. Not so many weeks ago there was plenty of sober thought along the lines of introducing inexpensive, light cars as a means of stirring up the volume market. At least three producers had designs all worked out for models in this category in the belief working classes could be induced to buy new cars if the price was right.

But later study seems to have demonstrated that even if such lines were available they would not sell in sufficient volume to insure a profit. While Willys, starting practically from scratch, sold 80,000 small cars last year, it must be remembered this performance was made while the rest of the industry was booming through a 5,000,000-car year, quite the reverse of conditions today.

Postpone Light Models

The apparent reason working classes could not buy such cars now is simply because they are not earning enough to finance the expenditure. And further, the reason they are not earning enough is simply because the industry cannot sell the cars it produces fast enough, which brings the reasoning right back to where it started.

At any rate, it seems unlikely that Chrysler's 4-cylinder light car, or the Nash bantamweight design, or the Ford 105-inch wheelbase model will see the light of day before the 1939 model season. A number of samples of the small Nash were produced by Briggs here some time ago, but Nash officials are disinclined to proceed further at this time. Their new model program on regular Nash and Lafayette lines is amounting to well over $10,000,000.

This again brings up the increasingly tough row which so-called independent producers are having to hoe. When equipment and die costs must be absorbed by a single line of cars as against spreading such costs over an integrated line, when production is only a fraction of the volume achieved by the "big three", and when the situation is further complicated by a precipitous drop in business, the position of the independent producer is not an enviable one.

The obvious answer is said to be for the few remaining independents to get together and work out a cooperative program among themselves, to combat the low costs achieved by the large-volume producers. In fact, such an idea was once proposed, but conflicting personalities of the various participants soon quashed it. Those who have done business with the automotive industry for the past 15 years and who have observed its progress carefully are genuinely concerned over the outlook for independent producers at the moment, but they offer no plausible way out.

Perhaps the old law of the jungle regarding the survival of the fittest is taking its toll as the industry becomes of age, and any attempts to interfere with the normal functioning of supply and demand probably would react unfavorably to the buying public which continually seeks more car for the money.

■ GRAHAM is currently filling out production on a lot of 525 cars and when this is completed will seek to proceed on a further lot of 1000. A creditors' committee is studying the company's market possibilities, especially in the tractor field, and is attempting to speed negotiations toward a government loan of $500,000, plus an additional $250,000 of private financing, a part of this fund to be used to pay off small creditors and the balance to proceed on production.

The Grahams are known throughout the industry as real fighters and they are not going to permit the business to falter without a severe struggle.

Appearance of a group of Nash executives on a tour of the Graham plant recently has given rise to reports Nash may be examining the possibility of taking steps to acquire Graham, probably eyeing supercharger patents the company owns, as well as some of the advanced designs worked out for Graham by the late Amos Northrup. Some can see behind the activities of the Nash-Kelvinator group the guiding hand of Walter P. Chrysler, but it is difficult to substantiate such a connection, although George W. Mason, president of Nash-Kelvinator, was once a Chrysler executive.

Loyal to Local Industry

Another independent, Studebaker, turned out about 4500 cars in March and last week operated on the basis of about 1000 assemblies. The company's dealers report retail demand improving in the last few weeks. Meanwhile, an unusual type of appeal to citizens of South Bend has emanated from the Studebaker sales department in the form of a large handbill, urging native sons and daughters to "consider the immediate purchase of a 1938 Studebaker", the company pointing out that for every $5 of gross sales Studebaker makes, $1 remains in South Bend in the form of wages and payments to local business.

Ford has stepped up operations in the foundry department at the Rouge plant and is turning out about 1800 motors of the 85-horsepower type daily. A large stock of 60-horsepower motors still is on hand, estimates placing this bank as high as 70,000. Some of this reserve might be adapted for use in the new

Ford tractor, although Mr. Ford himself appears to be the only one in the organization who knows much about future plans for the tractor.

Some of these motors might be carried over into the 1939 models, although it has been suggested that a certain amount of rebuilding would be necessary if this were done, involving relocating of the fan in a lower position because of the likelihood of lowering the radiator grille next year in keeping with the trend established by this year's Lincoln Zephyr. Ford is reported to be contemplating the scheduling of 150,000 more cars to conclude the 1938 run.

Ford metallurgists are continuing experimental work in the field of centrifugal casting, and are reported to be giving some consideration to the use of cast steel cylinder liners made by this method.

"Stick to One Model"

Last week was an especially eventful one for Mr. Ford. On Monday and Tuesday, with Mrs. Ford, he celebrated their 50th wedding anniversary, receiving among other things a giant scrapbook containing 4000 testimonial letters from friends and well-wishers. To reporters Mr. Ford gave his formula for a successful marriage—"sticking to one model and picking a good mother-in-law."

Saturday Mr. Ford and his son Edsel participated in dedication ceremonies for the Wright home and shop in Greenfield village, a memorial to Wilbur and Orville Wright, aviation pioneers. Guests included many of the original flying students of the Wright brothers; two survivors of the group of five who witnessed the epoch-making first flight at Kitty Hawk, N. C.; ranking officers of army, navy and marine aeronautical staffs; aeronautical scientists; and flyers and executives of aviation companies and air lines.

Buildings restored to their original condition at Ford's Greenfield collection of Americana include the home where Wilbur Wright was born, and the bicycle shop where the brothers built their first airplane. Climax of the affair was a dinner at which C. F. Kettering, General Motors' research chief, and neighbor of Orville Wright in Dayton, O., was toastmaster.

■ REFRIGERATOR manufacturers here, large consumers of steel, are experiencing some seasonal improvement in business, although they are burdened by large inventories of parts and material purchased last fall as a protection against increasing prices. In some cases these stocks are so heavy that they have mitigated against extensive changes in new model refrigerators, although one builder will introduce for 1939 an entirely new design with completely sealed power unit.

The Leonard division of Nash-Kelvinator in Grand Rapids, Mich., reopened last week after a three-week shutdown, rehiring 1200. Norge is proceeding with expansion at Muskegon Heights, Mich., where it has the advantage of a plentiful supply of labor at rates somewhat below those prevailing in this section.

The Leonard division builds cabinets for Universal Cooler as well as for a score of units which carry only the names of department stores handling them. Of course Leonard also builds its own line, and with the important share of business held in this field by Kelvinator, the company spread-eagles a large share of the market.

Changes in the Buick fender designs for 1939 are reported to have recalled the die program well under way in a Toledo, O., shop.

De Soto was scheduled to have some new model material ready for submission to parts interests last Thursday, after a short postponement.

Detroit die shops contacting Willys for possible 1939 model business have been told nothing will be ready for release there until June.

A Detroit company has perfected a novel method of electrodepositing copper radiator cores over a low-melting point alloy which is fused out after the deposition, leaving a complete core of dead-soft copper.

A high-speed Christie tank has been under test by the American Automobile association before submission to the British army. The tank, developed by Walter Christie, old-time automobile race driver, was tested at the Westfield, N. J., airport, and, paced by a Hudson-Terraplane, showed speeds of better than 50 miles per hour.

Automobile Production

Passenger Cars and Trucks—United States and Canada

By Department of Commerce

	1936	1937	1938
Jan.	377,244	399,186	227,744
Feb.	300,810	383,900	202,872
March	438,943	519,022	†265,000
April	527,625	553,231	....
May	480,518	540,377	....
June	469,368	521,153	....
July	451,206	456,909	....
Aug.	275,934	405,072	....
Sept.	139,820	175,630	....
Oct.	230,049	337,979	....
Nov.	405,799	376,629	....
Dec.	518,958	346,886	....
Year	4,616,274	5,015,974	....

†Estimated.

Week ended	
March 19	57,555
March 26	56,800
April 2	57,500
April 9	60,975

(Production figures for the week ended April 16 will be found on page 21.)

Household Goods' Steel Consumption Sets Record

■ Refrigerators, kitchen ranges and electric washing machines represented a market for more than 457,000 gross tons of steel in 1937, a new record, estimates the American Iron and Steel institute.

About 222,000 tons were used in the 2,618,000 gas and electric refrigerators sold last year. Refrigerator sales in 1937 exceeded the previous record by nearly 20 per cent. Each requires an average of 190 pounds of steel.

Gas and electric ranges required 193,000 tons, on a basis of 190 pounds per unit. Range sales last year totaled 2,273,000, exceeded 1936 by 25 per cent and 1929 by 30 per cent. Forty-two thousand tons of steel was required in the 1,661,000 washing machines, an average of 57 pounds each. Washing machine sales fell just short of 1936, but exceeded 1929 by 50 per cent.

Apparent consumption of finished steel in the United States in 1937 was equivalent to about 2440 pounds per family of average size, an increase of less than 4 per cent over the estimated 2350 pounds in 1936. The increase of 90 pounds is the lowest since production and consumption began to climb from the low levels of 1932. The 1937 figure, however, was the highest since the 1929 peak of 2950 pounds per family. It was nearly 9 per cent below the 2675-pound average from 1925 through 1929.

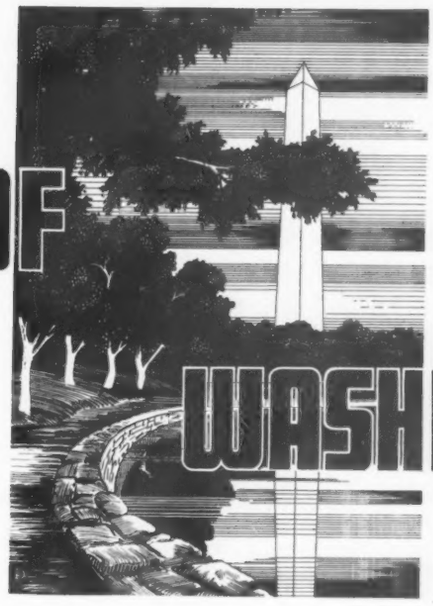
Per-family consumption in the United States ranged from 50 per cent to more than 200 per cent greater than in leading foreign steel-producing countries.

Fairbanks, Morse Workers Receive $106,114 Bonus

■ Bonus checks totaling $106,114.54 were distributed April 1 to 4472 eligible employes of Fairbanks, Morse & Co. Only factory workers and others employed on a salary basis were eligible for participation in the profit-sharing plan.

Bonus payments were based on $2,148,432 earnings during the last fiscal year. Total sales in 1937 were $30,596,350, against $26,827,891 in 1936. Despite the 14 per cent increase in sales, net profit was 4.64 per cent lower.

WINDOWS OF WASHINGTON



WASHINGTON

■ THE SENATE passed the $5,000,000,000 revenue bill in record time under the leadership of Senator Pat Harrison, Mississippi, and it is now in conference.

A number of important changes of special interest to industry were made. The undistributed profits tax was changed to a flat rate of 18 per cent on corporations with net incomes exceeding $25,000. To aid the "little business" man with a net income of $25,000 and less, it was provided that a credit of 10 per cent of the difference between the actual income and $25,000 should be allowed in computing taxable income.

Imposition of a flat tax rate of 15 per cent upon capital gains from property held more than 18 months, eliminated a house provision under which certain percentages of the gain would be applied to the ordinary income and subjected to regular rates.

Liquidation period for personal holding companies was extended from two to three years to eliminate necessity of dumping securities on the market within a brief time.

Holding companies liquidating under the "death sentence" clause of the public utility holding company act were exempted from the capital gains tax.

The senate reduced from three to two years the period in which the adjusted value of capital stock is to be made. The first period would end in 1938, instead of in 1939, as now provided. The next period, if the provision adopted is retained in conference, will end in 1940.

RAILROAD DIFFICULTIES PASSED ON TO CONGRESS

President Roosevelt sent a message to congress last week dealing with the railroad situation. He did not make definite recommendations but rather put the problem on the doorstep of congress for solution. With his message, he included recommendations of three members of the interstate commerce commission.

Included in the recommendations is one of special interest to the steel industry, suggesting that approximately $300,000,000 be made available from government funds for buying railroad equipment, the equipment to be security for the advance. This was suggested as an immediate relief. The members of the commission also informed the President that the commission, as such, does not feel justified in expressing an opinion for or against the reduction of railroad wages.

The commissioners, in their long term program, suggested that a federal transportation authority be named for two years to promote action by railroad companies to eliminate waste and aid consolidation and co-ordination.

The President pointed out that the troubles of railroads are not new but that they have been getting steadily more difficult since the beginning of the World war. He said that it is true that a general upturn in business would undoubtedly help to keep many railroads from actual receivership. It is also true, he said, that the resumption of last year's level would not solve the growing difficulties permanently.

NEW LOW COST HOUSING PROJECT IS UNDER WAY

For several years Washington has been offered numerous low cost housing experiments, on behalf of the government and private industry.

Another project has come forward, in which leaders of several equipment industries, including steel, are apparently much interested. If the information reaching Washington is correct, these people are interested in the low cost housing projects which have been carried on by the farm security administration, which is an outgrowth of the old resettlement administration.

The story goes that in the set-up, which is not governmental, the materials for the low cost housing are to be obtained at reduced prices so that a house built under present standards could be erected at about half of the cost usually charged. It is said that labor unions have agreed to a lower rate per hour, probably on the basis that they would receive an annual salary rather than taking a chance on an hourly wage.

Captain R. B. Lord, who is co-ordinator and director of construction of the farm security administration, has had considerable experience in erection of low cost houses and he has stated that "in the early stages of the construction program, ratio of labor to materials was something like 65 per cent for labor and 35 per cent for materials. Under the new low cost program, this ratio has been completely reversed so that 65 per cent is being spent for materials and 35 per cent for labor."

Shortcuts Lower Cost

In connection with the relationship that this program may bear on future construction practices, Captain Lord said "first of all, to reduce the cost of housing, the principles of design can be applied by any architect or by any association interested in producing a low cost house. Secondly, however, the principle of precutting and prefabrication can be obtained through a co-operation between the contractor and the local dealer where this service can be supplied to the contractor for a small additional charge."

Captain Lord estimated that addi-

BY L. M. LAMM
Washington Editor, STEEL

tional low cost dwellings will be required during the next 10 years due to the growth in population and to a more rapid growth in households. He has stated that the farm security administration is glad to make available to anyone the methods under which its low cost housing units were constructed. It is believed that the industrialists who have this matter under advisement and who will meet within the next few weeks in New York, are consulting the organization for advice.

HOUR, WAGE BILL MEETS HARD GOING IN HOUSE

Congress continues to have difficulty with the hours and wages bill. After some weeks of consideration, the subcommittee of the house labor committee, of which Representative Ramspeck, Georgia, is chairman, reported what it termed a compromise bill. No sooner was this bill made public through the well-known underground channels, than William Green of the A. F. of L. precipitated a new committee controversy by vigorously opposing certain aspects of the newly written bill.

The bill, which was revamped by the subcommittee and which is pending before the full committee, provides for creation of an independent five-member board to administer its provisions. It also would provide for a graduated work week of 40 to 48 hours. The minimum wage provisions require the new board to fix an average wage for each occupation in a given industry and the minimum fixed could not go below that average. It was further provided in the subcommittee bill that the new board in its first minimum wage order could not fix a wage more than 5 cents above the weighted average wage and could not further increase it before the expiration of a year. At the end of each such period, it could increase a wage by not more than 5 cents an hour until the minimum reaches 40 cents an hour.

The report is that the majority of the house labor committee favor reporting out a bill of some kind during the present session but the members are divided many ways as to the method, and the house rules committee still stands as an adamant barrier to conclusive house action. It is doubtful whether this legislation will become law at the present session, especially if adjournment comes as early as is now being predicted on Capitol Hill.

NAVY NEEDS MILLIONS FOR NEW MACHINE TOOLS

There is talk that the navy department will ask for between $8,000,000 and $10,000,000 for machine tools and other facilities for navy yards in the second deficiency bill, soon to go to congress. Officials of the navy department will not discuss the report, which comes from authoritative sources. This fund would be used to get navy yards in condition for the proposed big navy shipbuilding program.

Several years ago a survey was made of machine tool equipment at navy yards and it was found that it was of poor quality and obsolescent. At that time it was estimated it would cost about $15,000,000 to bring equipment up to date. It is estimated machine tools in navy yard shops is worth $39,000,000 and that a yearly outlay of $1,900,000 would serve only to keep the maximum age below 20 years.

COMMISSION SEEKS LOWER BIDS ON CARGO SHIPS

The United States maritime commission has rejected all bids for construction of eight of the 12 standard steel cargo vessels which were opened Feb. 1 and invited new proposals for the construction of 12 ships of the same type. These proposals are returnable Tuesday, May 3.

The commission recently approved the bid of the Tampa Shipbuilding & Engineering Co., Tampa, Fla., for construction of the remaining four of the 12 vessels on which proposals were originally sought, but the award is in abeyance until the company makes financial arrangements satisfactory to the commission to insure the completion.

The Tampa company, which bid lowest of the eight firms which submitted proposals, bid $7,262,652, or $1,815,663 each, for four vessels with diesel propulsion, prices which the commission approved as falling within the range of its own estimates. Other bids were as much as 68 per cent higher.

In announcing this action Emory S. Land, chairman, disclosed that for several weeks the commission has been seeking through negotiation to induce other bidders to reduce prices in line with estimates so that contracts could be awarded for all of the 12 vessels.

STATE MARKETING LAWS TO BE SURVEYED BY WPA

WPA will shortly begin a project to survey state marketing laws. It is announced the survey is designed to obtain legal and economic data concerning laws and make them available in useful form to all federal and state governmental agencies, as well as businessmen and trade associations. The field work will be carried on in co-operation with some of the existing machinery of the WPA.

Among some of the laws to be examined are included: State and antitrust laws modeled after the Sherman act, anti-price discrimination laws modeled after the Clayton and Robinson-Patman acts, and those laws which set up state trade commissions. Also, under laws affecting consumer prices, those which place a mandatory level below which prices cannot fall, and fair trade laws which permit producers to fix retail prices through price contracts. A great many other similar laws will be gone into.

According to WPA officials, information will be sought through co-operation of trade associations and individual business organizations relative to the effects of the various laws studied on trade and consumer price levels and other merchandising policies.

AUSTRIA LOSES PREFERENCE

Effective May 6, according to Presidential proclamation, Austria will be taken off the list of most favored nations under reciprocal trade treaties. This was necessary because Germany is not on that list and that country could send its products through Austria to the United States if the latter were allowed to retain most favored nations privileges.

Under this new proclamation Austrian products entering this country will be charged full tariff duties without regard to concessions to other countries. Imports into the United States from Austria of iron and steel products and machinery are practically non-existent.

BOARD CERTIFIES FOR CIO

All production workers at five Pennsylvania plants of the Aluminum Co. of America are to be represented by the Aluminum Workers of America, a CIO union, according to an announcement of certification by the national labor relations board.

Action came as the result of a public hearing in Pittsburgh in January. The union presented evidence to show that it represented a majority of the workers. Union representatives testified that 5920 workers had signed applications for membership. Plants covered by the board's certification are located in New Kensington, Arnold and Logan's Ferry, Pa.

CUBAN SCRAP EXPORTS UP

Exports of scrap iron and steel from Cuba during 1937 totaled 68,047 metric tons, valued at approximately $546,729, almost double the 1936 volume of 38,833 tons valued at $171,046 the previous year, according to a report to the department of commerce from the office of the American commercial attache at Habana.

EDITORIAL

Wasted Billions Put Brakes on Recovery; Pump Priming Results Only in More Taxes

■ CONGRESS of late has demonstrated a more friendly attitude toward business. Not only has the senate removed the most objectionable features of the new revenue bill but a host of radical measures have been shelved. So-called liberals who would stop at little short of complete regimentation of all activities are meeting with a resistance that is reassuring.

But congress has not yet gone sufficiently far to provide a basis for a return of business confidence. Needed are modification of the present one-sided labor law, a real solution of the railroad problem, clarification of government policies with respect to utilities, modification of the supervision of the bituminous coal industry and many other correctives. Nobody will deny that this is a difficult order. Nevertheless it must be filled.

Most important of all our requirements today is a realization that the time has come for a marked reduction in government expenditures. There can be no real stimulant to confidence until business men become convinced that a sincere approach has been made to the problem of balancing the federal budget.

Higher Taxes Raise Selling Prices Beyond Ability To Pay

Taxes already constitute a staggering burden to business and industry and business men know only too well that with cost of government far outrunning income from taxation the trend must be toward higher taxes.

The theory that our economic problems can be solved by taking wealth away from the haves and giving it to the have-nots never did hold water. In essence, taxes are nothing more than items of cost that have to be figured into commodity selling prices. High taxes lead to sales prices which a decreasing proportion of the population can afford to pay. The consequence is less business, less production, fewer jobs and smaller payrolls.

Industry readily admits that those who are unemployed through no fault of their own must be fed, clothed and sheltered. It is opposed, however, to the existing conception of relief. It sees the waste and inefficiency with which billions of dollars are squandered. It sees the extent to which the huge relief expenditures cause a continued growth in bureaucracy and the extent to which they serve purely political purposes.

Spending Orgy Must Give Way To Sane Business Methods

The most vital matter before the American people today, therefore, is the project to authorize the expenditure of several billions of additional dollars for relief. The project calls for a continuation of the same wasteful methods that have proved so costly and so deficient in lasting results in the past few years. It would add to our indebtedness an amount that would positively guarantee an even more pronounced trend toward higher taxes.

Clearly, it is time to take a business-like view of the relief problem. Congress should provide relief, but only that which is essential and within our ability to pay.

It should be understood generally that any congressman who votes for the project as now contemplated is no friend to business, to those who depend on business and industrial payrolls for their subsistence and to merchants, farmers and many others who are vitally concerned with the maintenance of these payrolls.

THE BUSINESST

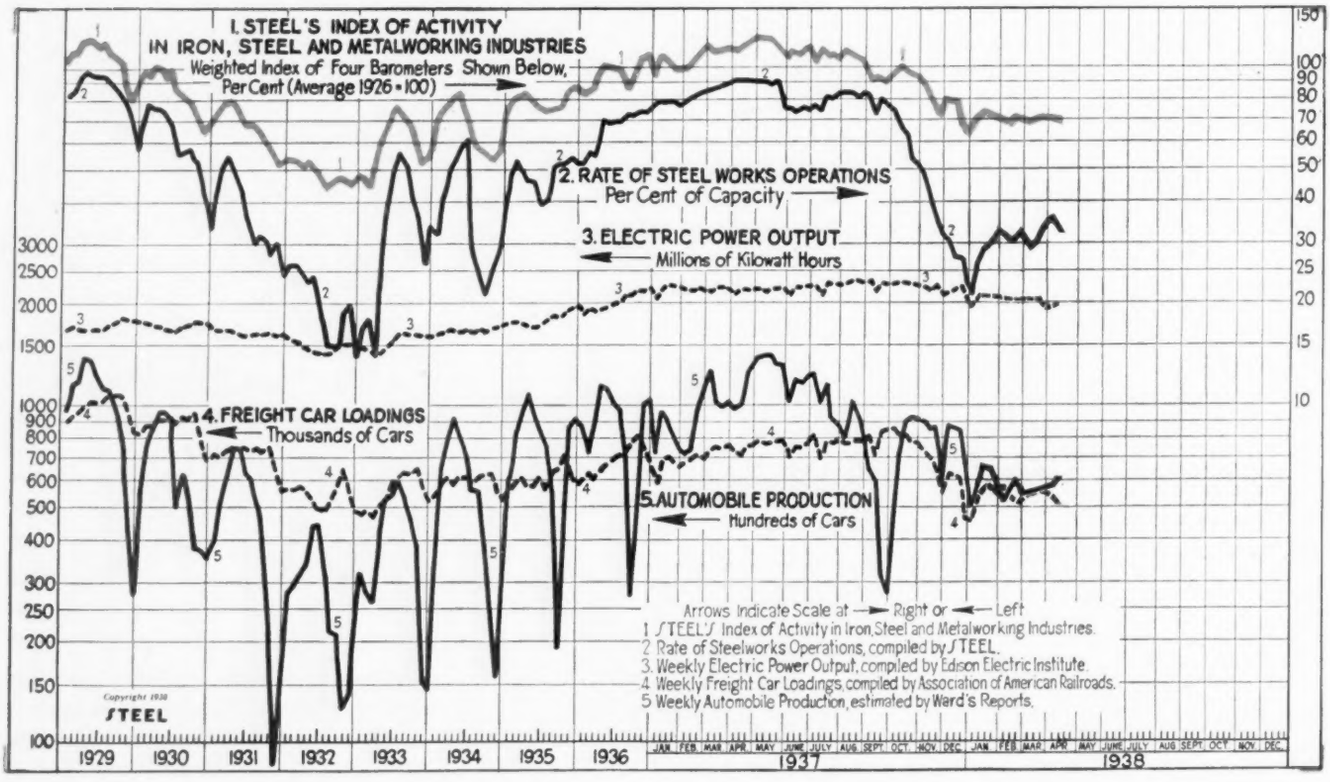
Activity Index Recedes to Mid-March Level

■ DESPITE moderate gains in automobile assemblies and electric power output in the week ended April 9, STEEL's index of activity in the iron, steel and metalworking industries declined 1.1 points to 70.9 per cent.

The easing of the index was due primarily to the sharp drop in steelmaking operations from 36 per cent in the week ended April 2 to 32 per cent in the week ended April 9. The recent relapse in steelworks activity was the severest for any single week this year and erases all the gains registered since mid-March when the rate also stood at 32 per cent.

The most encouraging feature of the present situation is the brighter outlook in motordom. Auto output registered a substantial increase to 60,975 units in the week ended April 9, to exceed the 60,000 car-per-week level for the first time since the week ended Jan. 22. Barring shutdowns due to labor disturbances, a steady climb in production is anticipated until the end of May.

Electric power output again registered a moderate gain to 1,990,447,000 kilowatt-hours in the week ended April 9, coming within striking distance of the 2,000,000,000 kilowatt-hour level. Revenue freight car loadings suffered a further set-back to approximately 500,000 cars in the week ended April 9, losing all the ground gained during March. This is the lowest volume of traffic for any single full week this year.


1. STEEL'S INDEX OF ACTIVITY IN IRON, STEEL AND METALWORKING INDUSTRIES
Weighted Index of Four Barometers Shown Below, Per Cent (Average 1926 • 100)
2. RATE OF STEEL WORKS OPERATIONS
Per Cent of Capacity
3. ELECTRIC POWER OUTPUT
Millions of Kilowatt Hours
4. FREIGHT CAR LOADINGS
Thousands of Cars
5. AUTOMOBILE PRODUCTION
Hundreds of Cars
Arrows Indicate Scale at → Right or ← Left
1 STEEL'S Index of Activity in Iron, Steel and Metalworking Industries.
2 Rate of Steelworks Operations, compiled by STEEL.
3 Weekly Electric Power Output, compiled by Edison Electric Institute.
4 Weekly Freight Car Loadings, compiled by Association of American Railroads.
5 Weekly Automobile Production, estimated by Ward's Reports.
Copyright 1938 STEEL
1929 1930 1931 1932 1933 1934 1935 1936
1937
1938

STEEL'S index of activity declined 1.1 points to 70.9 in the week ended April 9:

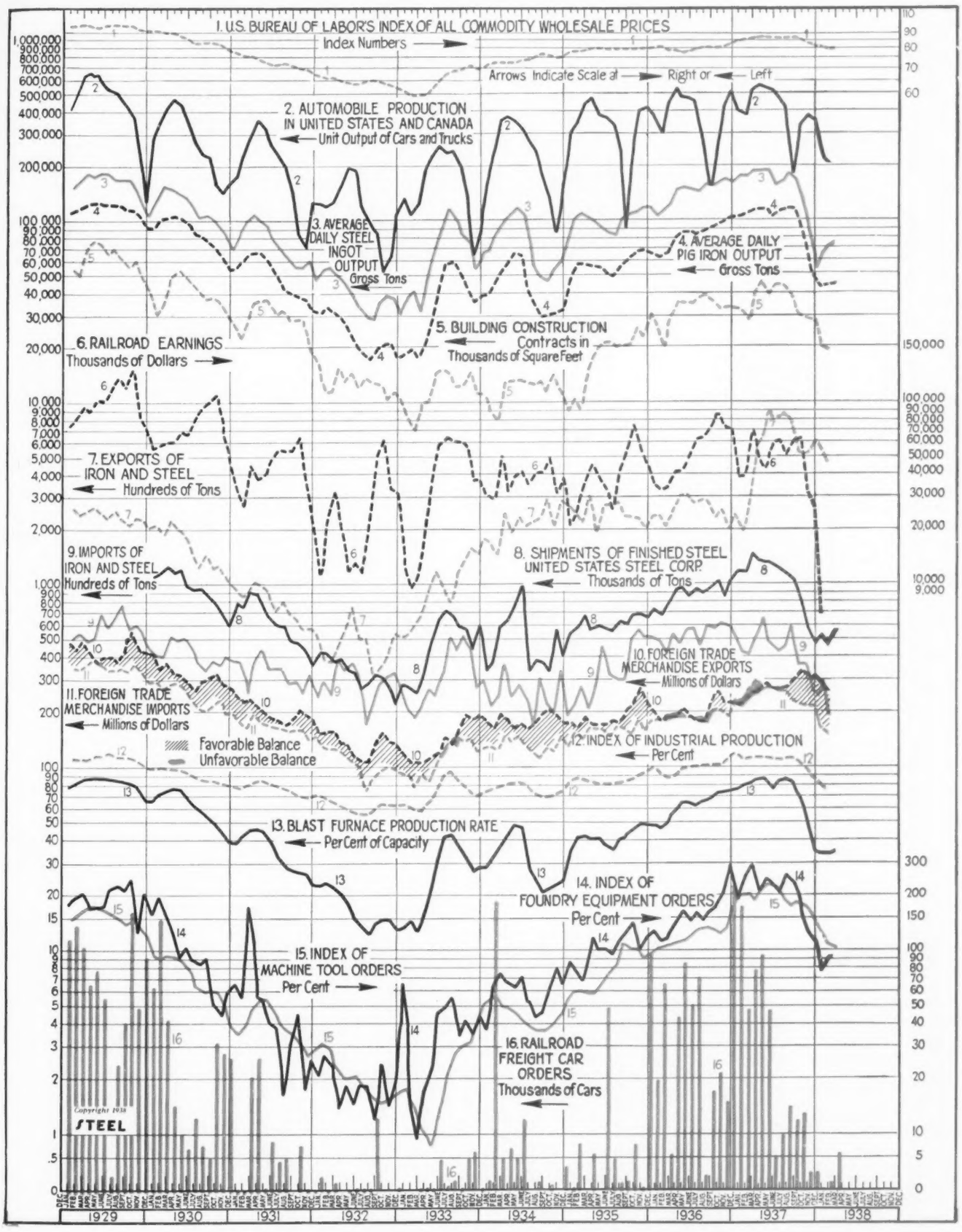
Week ending	STEEL'S Index of Activity Index No. 1938	1937	Steelworks Operating Rate Per Cent 1938	1937	Electric Power Output Million KWH 1938	1937	Freight Car Loadings 1938	1937	Weekly Auto Output 1938	1937
Jan. 8	70.1	107.8	26.0	79.5	2,139	2,244	552,314	698,529	54,084	96,780
Jan. 15	74.4	106.7	29.0	79.0	2,115	2,264	580,600	700,238	65,735	91,685
Jan. 22	74.7	104.0	30.5	80.0	2,108	2,256	570,333	670,376	65,418	81,395
Jan. 29	73.8	99.6	33.0	76.0	2,098	2,214	553,176	659,790	59,365	74,148
Feb. 5	70.9	100.8	31.0	79.5	2,082	2,201	564,740	675,026	51,443	72,295
Feb. 12	71.2	101.9	30.0	81.0	2,052	2,199	542,991	691,618	57,810	72,850
Feb. 19	71.9	108.8	31.0	83.0	2,059	2,211	535,790	714,884	59,100	95,698
Feb. 26	70.3	112.8	30.5	84.0	2,031	2,207	511,930	696,727	56,977	111,915
Mar. 5	70.1	117.9	29.5	86.0	2,035	2,199	552,916	734,127	54,440	126,975
Mar. 12	70.8	112.7	30.0	87.0	2,014	2,212	556,664	748,993	57,438	101,684
Mar. 19	71.3	113.1	32.0	89.0	2,017	2,211	540,332	759,269	57,555	99,013
Mar. 26	72.4	114.0	35.0	90.0	1,975	2,200	572,952	761,109	56,800	101,046
Apr. 2	72.0†	112.0	36.0	91.5	1,978	2,146	523,489†	726,687	57,500	97,005
Apr. 9	70.9*	112.8	32.0	91.5	1,990	2,176	500,978*	716,044	60,975	99,196

*Preliminary. †Revised.

STEEL TREND

Key:	Feb. 1938	Key:	Feb 1938	Key:	Feb. 1938	Key:	Feb. 1938
1	79.7	5	18,903,000	9	19,589	13	34.5*
2	202,872	6	2,136,481‡	10	262,733,000	14	90.4
3	74,513*	7	460,640	11	163,085,000	15	100.4*
4	47,851*	8	572,192*	12	79.4*	16	680*

*March. ‡Deficit (not shown on chart).



Key: 1. U. S. Bureau of Labor's Index of all Commodity Wholesale Prices. 2. Automobile Production in United States and Canada, compiled by U. S. Department of Commerce. 3. Average Daily Steel Ingot Output, compiled by American Iron and Steel Institute. 4. Average Daily Pig Iron Output, compiled by STEEL. 5. Building Construction, Contract Awards in 37 States, compiled by F. W. Dodge Corp. 6. Railroad Earnings, Net Operating Income for Class I Roads, compiled by Bureau of Railroad Economics. 7 and 9. Iron and Steel Foreign Trade, reported by Bureau of Foreign and Domestic Commerce. 8. Shipments of Finished Steel, United States Steel Corp. 10 and 11. Foreign Trade, Value of Exports and Imports, reported by Bureau of Foreign and Domestic Commerce. 12. Index of Industrial Production (adjusted for seasonal variation; average 1923-25=100) computed by Federal Reserve Board. 13. Blast Furnace Production Rate, compiled by STEEL. 14. Index of Foundry Equipment Orders (Average 1922-24=100), compiled by American Foundry Equipment association. 15. Index of Machine Tool Orders (Three-month moving average; average monthly shipments 1926=100), compiled by National Machine Tool Builders association. 16. Railroad Freight Car Orders, compiled by STEEL.

Making Room Coolers

Advanced production methods include precision machining, stamping, forming and finishing operations. Also, assembly line operations and sequence are described

By J. H. VOGEL
Assistant Works Manager
York Ice Machinery Corp.
York, Pa.

■ AIR CONDITIONING already is taking its place as a lusty consumer of steel, especially flat-rolled grades. Sales of portable air conditioners alone are expected to reach a total of 35,000 to 40,000 units during 1938, a substantial increase over 1937. Like the home refrigeration business, air conditioning is moving ahead in spite of the recession.

Convinced of a bright future for air conditioning, York Ice Machinery Corp., York, Pa., recently launched production of a new portable unit on an assembly line basis. York, established in 1885 and an old-timer in commercial and industrial refrigeration, is finding air conditioning valuable in taking up slack in the ice plant equipment business which reached its zenith around 1926 and which subsequently has suffered from inroads made by mechanical home refrigeration. Where an entire building was once devoted to manufacturing galvanized sheet steel ice cans, much of this space now is used in making parts for air conditioners.

The 1938 Yorkaire portable air conditioner or room cooler, shown in Fig. 1, culminates a 5-year period of development. With a total weight of 500 pounds, it is 55 pounds lighter than its immediate predecessor. After tentative plans for this new unit had been laid out, a number of full size operating models were built. Each part as well as completed units were checked for capacity, endurance and Underwriters' requirements. Prior to production several groups of complete units were constructed to study manufacturing problems.

The York Balanseal compressor using "Freon-12" is the heart of this unit. Dichlorodifluoromethane, the chemical name for "Freon-12" is an excellent refrigerant especially valuable in human-comfort cooling applications. York Balanseal compressors are built in 38 different sizes and types. Extremely small tolerances are allowed so workmanship is on a par with that found in airplane engines and similar precise equipment.

The 1¾ x 1¾-inch, twin-cylinder compressor built into these portable air conditioners uses an enclosed crankcase cast in one piece of electric furnace nickel iron. Large oil sight glass in the side of the crankcase is made of heavy, white, annealed glass. Crankcase is milled, top and end, on a semiautomatic miller and bored for crankshaft on full automatic machines. Bolt sections are drilled and tapped on multiple machines.

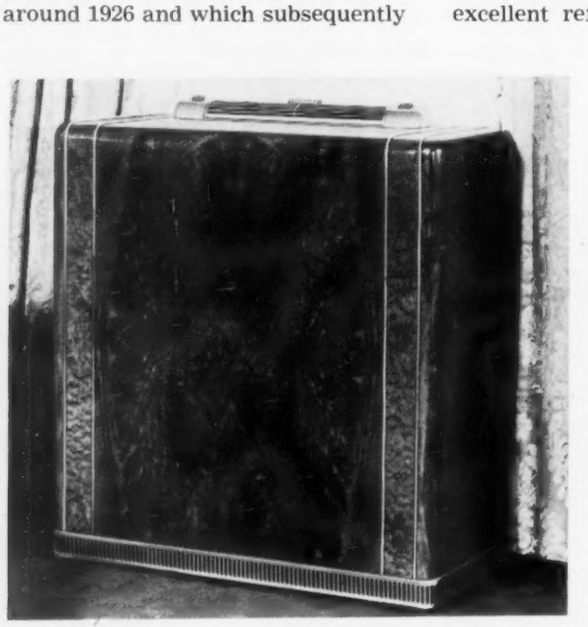


Fig. 1—York air conditioner with grained finish and five controls built into exhaust grille at top of unit

Cylinders Designed Simply

Cylinders are of high-grade nickel iron and employ a simple design to permit precision-machining. A special test lug cast on each cylinder is removed to check for uniform texture and hardness. Fins cast on exterior cylinder walls provide heat dissipation and also add strength. Top and bottom surfaces are precision milled and then bored on a 6-spindle vertical machine which has an automatic cutting cycle. Roughing, semi-final and final boring operations are then performed. All holes are made by multiple drilling heads.

Special metal gaskets are used. Relief areas in gaskets reduce net face area and increase pressure per square inch to produce a gas-tight fit without exerting undue strain on the cap screws.

A feature of this machine is the double-trunk type piston. It is said the York 2⅝-inch piston was the first to be turned successfully on a precision diamond boring machine. All Balanseal compressors now have this type of piston finish. Machin-

Fig. 2—Illustrating steps in stamping and forming exhaust grille. Openings are also flanged in one of the final operations

ing operations—turning, facing, boring and ring-grooving—are fully automatic. Final operations—finishing, turning, wristpin boring and valve-surface facing—are performed on precision machines.

"Pressure-flex" suction and discharge valves composed of imported Swedish steel disks are fitted to top of pistons with a single bolt at the center. They do not rely on an oil seal. Forging material for crankshafts is selected by the McQuade-Ehn test—an analysis of samples cut from the ends and center of a forging bar. I-beam type connecting rods are machined with a combination of semiautomatic and precision boring equipment. Connecting rod perfection is obtained by diamond boring both crankshaft and piston pin end.

Shaft Seal Unique

A unique feature is the shaft seal, a Swedish steel diaphragm which utilizes crank case pressure to maintain a constant tension against the sealing surface around the crankshaft. No spring or metallic bellows is necessary. Other features of the compressor include a centriforce oiler on closed end of crankshaft, full floating piston pins, centrifugally cast babbitt bearings, etc.

All machine parts manufactured by the York company pass through a continuous line of operations from rough castings to the final inspection. At each station, accuracy of work done is checked by gages. Compressor is assembled in a dust-free air conditioned room and put on a test run under actual refrigerating conditions, after which it is ready for the assembly line.

Many interesting piercing and forming operations are involved in manufacturing the sheet metal parts for this portable unit. Much time was spent in analyzing and simplifying these stampings to produce maximum strength with minimum material. Curved lines of outside casing, cylindrical air outlet and fan scrolls offered complications in die design.

Air outlet grille casing is cold-rolled steel with a deep draw. Several steps are shown in Fig. 2. It involves eight operations: Blank, square shear or notch, first draw on air press, final draw of outside and preliminary form of openings on double-acting press, pierce eight bolt holes on single-acting press, pierce two small front holes, pierce holes for controls and half of grille, simultaneously pierce other half of the grille hole on same press. Control and grille holes are flanged on same press and at same time as this last operation.

Motor mounting is a ribbed strip bent U-form at right angles to the ribs, providing a rigid supporting frame. This can be seen as the main element at start of assembly shown in Fig. 4. Hot rolled, pickled and oiled sheet metal is used and the operations are as follows: Square shear to size, square shear four corners, pierce gage hole, pierce hole in end, form W-shape, form U-shape, form wiring clearance pocket, and pierce four holes in bottom.

A number of other stampings are used including condenser and evaporator fan scrolls, bottom pan and all condensate drip pans, motor plate, all panels for outside decorative casing, top section and partitions for window duct, as well as control housing.

Forms Outside Insulation

The decorative exterior casing forms an outside insulating air-chamber and possesses a rich, walnut-grain finish selected to blend with any surroundings. Casing itself consists of five sections: A large front panel of stretcher-leveled stock, two flanking 3-inch strips of cold-rolled steel and two end panels of deep-drawn steel.

The walnut-grain finish on these panels involves a careful procedure. First, stamping is degreased by immersion in cleaning fluid which leaves it clean and dry. Panel then is wiped and sprayed with a deep tan shade of brown enamel. After baking at 300 degrees Fahr. for about one hour, panel is sanded down wet to smooth the surface. Just before the grain finish is applied, panel is tac-wiped to remove any possible dirt or fuzz. Grain finish is applied in an air-conditioned room in which a positive air pressure is maintained continually to eliminate any dust or dirt infiltration. Giant engraving plates are covered with a dark brown ink of the desired adhesive consistency and the grain design picked up by huge rollers and transferred directly to the panels as shown in Fig. 4. Then they are baked to dry the ink, tac-wiped again to remove dirt, and "build-up" varnished. After a third baking process, panel is resanded without endangering the grain finish.

The five pieces are then assembled with golden trim between pan-

Fig. 3—Start of assembly line with bottom portion of crate and part of main frame. Motor supporting bracket is being fastened in place

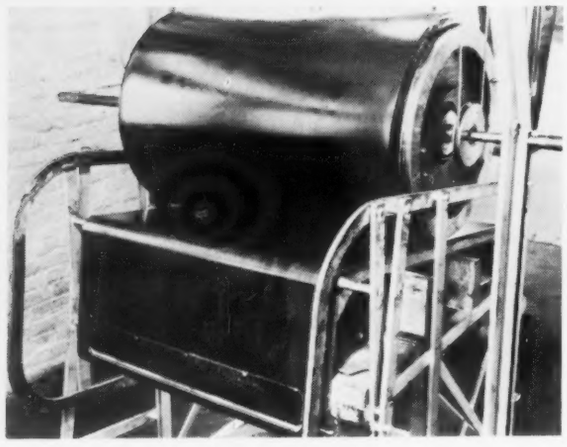


Fig. 4 — Machine rolls print grain finish on three sides of panel without breaking pattern

els and a coating of thermal insulation glued on the inside. Window ducts are ground-coated with a dark brown enamel in the same manner as the decorative casing. They are finished with a golden-spray lacquer.

Parts Are Degreased

Grilles and sheet metal parts subject to moisture within the unit are degreased, Bonderized, rinsed, set in a hot solution of weak chromic acid, and sprayed with "Blue Primer". Frame is brown enameled.

Condenser and evaporator fin coils are made of copper tubes, thrust through thin copper fins. An effective metal-to-metal bond is produced between fin and tube by dipping the coil in a tin-alloy bath. This also forms protecting film for the copper surface.

Liquid receiver is a pressed steel cylinder with ends securely sealed by the copper-hydrogen brazing process. In the York test plant, these cylinders withstood internal pressures up to 1500 pounds per square inch. Condenser fan rotor is made of a corrosion-resistant aluminum alloy as evaporator coil condensate drains into this fan and is blown out the exhaust air duct. Evaporator fan rotor is of standard aluminum alloy.

Assembly, as shown in Fig. 4, begins by setting up basic frame of the unit which includes right and left rear corner angles spot-welded to the bottom pan with a horizontal bar connected to the tops of the angles. Into the bottom pan is glued ½-inch insulating material. This insulation also is used on partitions and fan scrolls within the unit.

Next comes the compressor and ¾-horsepower motor assembly. The U-frame support is fastened to the bottom of the unit and the plate to support the compressor carriage is arc-welded to it. On top of this plate are fastened springs and rubber snubbers which float the compressor and motor which are suspended as one unit with the motor under the supporting plate counterbalancing weight of the compressor above.

Condenser fin coil is fastened into place and then condenser fan, drip pan and receiver. Condenser fan is driven by a shaft direct from the compressor motor while a 1/20-horsepower motor drives evaporator fan which is installed next.

Now evaporator pan with drain to condenser fan is fastened near top of unit in horizontal position. Above this is placed the cooling coil.

Vibration Eliminated

Next all loose copper lines are fastened, joints brazed and expansion valve placed in the liquid line. To eliminate vibration transfer from compressor to frame, suction and discharge lines are made long with a number of bends. For uniformity, these bends are made on wooden forms.

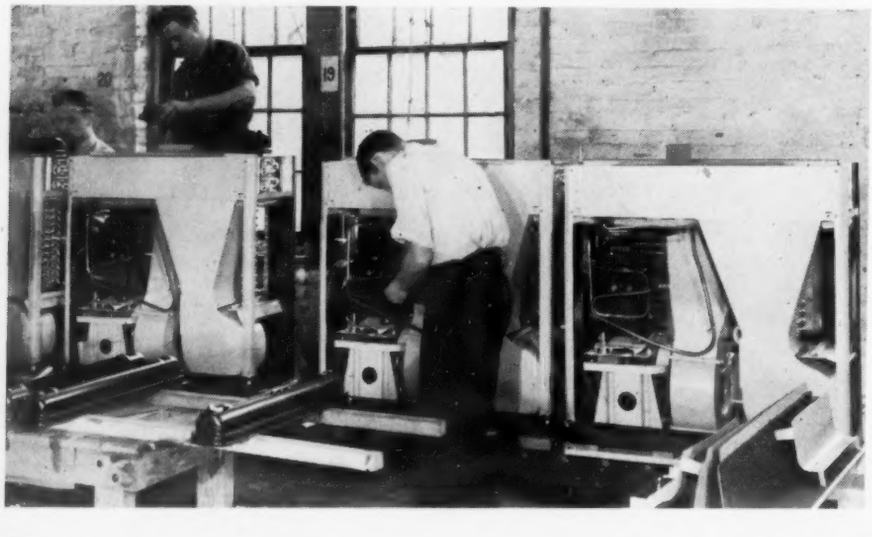
Top plates and front top metal plates are installed to enclose evaporator coil and cylindrical room air exhaust grille is placed in position. During this operation bakelite control handles, switches and wiring are installed. Fig. 5 shows units near this stage of assembly where they are almost completely assembled except for the outer finish casing.

An insulating panel is fastened below the condensing coil and the unit given a thorough assembly inspection. Refrigerant is charged into the condensing system and a test made for leaks with a Halide torch. Unit then is connected to electric power and put on test to check functioning of condensing system.

Next decorative wood-grain finish casing is fastened in place and the unit put on final test where actual load conditions are simulated by steam coils which supply heat to the test room. In an adjoining chamber the condensing air temperature is controlled and sprays produce the desired humidity. Carefully recorded readings are taken for air flow from the unit, power input, temperature maintained, etc. Unit then operates for 24 hours as an additional check.

Subsequently unit is crated for shipment. Decorative casing, supporting feet, filter, return grille, window duct and adaptor are not attached to the unit but are crated and shipped separately.

Fig. 5—Applying exhaust grille and controls near end of assembly line. Conditioner is practically complete with exception of outside ornamental casing



Chromium Covers In Use Four Years

■ Four years ago, two sets of covers and lids of high-chromium castings were installed on the cooking range of a plant cafeteria. Recently, they were examined and found to be in good condition after being in use continuously since 1933. They had not cracked, warped or shown any signs of oxidation even though the range was fired with anthracite coal and continuously kept at a high temperature. It is estimated that under present conditions for use the cover will last indefinitely.

Transparent guard prevents hand being inserted while cutter is operating. Right—The Possons guard pulls the hands from the die as it descends

Effective Program Establishes Safety Record

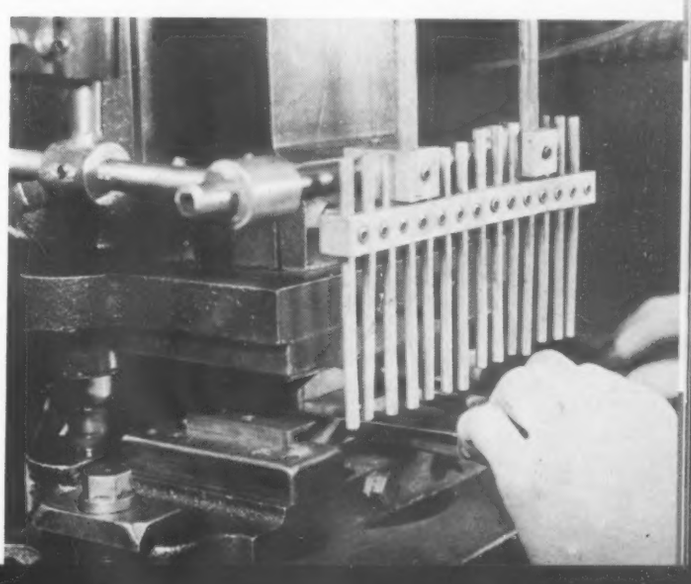
■ Endicott, N. Y., plant of International Business Machines Corp. established a record of over 4,500,000 man-hours without a lost-time accident during the period from August, 1936, to June, 1937, and since then has operated nearly 4,000,000 man-hours without a lost time accident in a continued effort to break the former record. This compares favorably with the all-time record held by the Old Hickory, Tenn., plant of E. I. du Dont de Nemours & Co. of 11,361,846 man-hours.

The safety program largely responsible for the Endicott plant record consists of use of guards and mechanical safety devices wherever possible in addition to a program of safety consciousness enforced by a full-time supervisor, a safety inspector, fire inspector, central safety council consisting of plant superintendent and his assistant with the plant manager and supervisors of machine and assembly departments, and also a safety committee of 40 workmen selected by the workmen themselves.

At a monthly meeting of these men, accident facts and figures are given and safety problems discussed. Primary responsibility for safety work rests with the foremen. Individual workers receive their safety education through contact with the foreman and the department safety man, through safety posters and literature. Meetings are followed up by inspections and reports. Classes in Red Cross first aid now are part of the regular employe educational program.

Effectiveness of this safety program is demonstrated by comparing 1928 with 1937 figures which show that while man-hours of operation were doubled and number of employes was tripled yet man-days lost through accidents declined from 749 in 1928 to but 5 days of lost time in 1937.

This air nozzle guard prevents chips from flying in operator's face. Below—Finger type guard prevents hands from being drawn into press



Castings Designers Should Know Laws of Solidification

■ SECOND New England foundry conference, held under the joint sponsorship of the New England Foundrymen's association and the Massachusetts Institute of Technology, Cambridge, Mass., April 8-9, was featured by an excellent program and attendance of 362.

An important paper, "Controlled Directional Solidification as Related to the Design of Castings," was presented by C. W. Briggs, physical metallurgist, United States naval research laboratory, Washington. Discussing mechanization of freezing, Mr. Briggs stated that freezing progresses from face to center of the casting. By establishing temperature gradients in the castings it is possible to produce directional solidification proceeding from progressive solidification. Temperature gradients may be controlled by size of the casting and by gating or heading. The manipulator has control of freezing in directional solidification but has no control over the sequence in progressive solidification.

Resort to Chills

While it is proper to feed a smaller section through a heavier one, Mr. Briggs said, this is not possible at times and it is necessary to resort to chills. Application of directional solidification requires the mold and core to be as collapsible as possible. Rate of skin formation is governed by two factors, absorption of heat by the walls during first cooling and subsequent transfer of heat through walls of the mold. The speaker stated increase in surface area does not increase the rate of solidification. Care must be given to junction feedings. Mr. Briggs showed through slides the solution of problems in these sections by changes in design and the application of chills.

Models Are Useful

Models are of value in developing gating and risering technique. Also radiographic examinations are important. The speaker recommended that the designing engineer make the section thickness as nearly uniform as possible. Foundrymen then can introduce padding and other means to provide controlled directional solidification. In the lower temperature alloys, temperature gradients in the mold are not great, but it still is possible to establish temperature gradients in the metal through methods of gating.

P. E. Kyle, department of mechanical engineering, Massachusetts Institute of Technology, presented a demonstration of crystallization. A small amount of a substance was heated between two slides, placed in a lantern and allowed to cool, with the result that the formation of crystals was shown. He also showed effect of several shapes of molds on structural formation and illustrated solidification of a material having two crystals of different types when solidified.

W. G. Reichert, Singer Mfg. Co., Elizabethport, N. J., presented a paper entitled "Casting Defects." Solution of the problem, he said, requires that management maintain certain fundamental policies. For example, steps must be taken quickly to investigate and classify causes of all defective castings. Then action should be taken immediately to correct the causes. A record should be kept of all casting defects. Many foundries have standardized their gating arrangements and have made card index files of types of gates for certain classes of jobs. Job responsibility, test data and casting defect data must be centralized and correlated.

Incorrect Design Troublesome

The speaker discussed internal shrinkage and stated that difficulty arises in pressure castings where the design is not correct. In general, shrinkage of the internal type can be corrected by proper gating, proper risering, proper chills and by the composition of the metal which will narrow down the solidification range. However, the same methods cannot be used at all times to accomplish the purpose. Close co-operation between designer and foundry is essential. A drawing should be submitted to the foundryman before the production of patterns is undertaken. Best design for a casting is one that presents least risk in manufacturing.

Mr. Reichert discussed risers and internal and external chills. Tendency to chill may be caused by an improper mixture, pouring metal into the mold at an improper temperature or, in the case of piston rings, humidity in the atmosphere. This difficulty may be corrected by the addition of ferrosilicon, graphite, or by methods of feeding. Segregation usually is present in those castings showing a tendency toward internal shrinkage. To prevent entrained slag, it is necessary to choke the metal somewhere in the gating system. However, the real solution is to melt hot iron so the slag particles free themselves from the metal and can be removed.

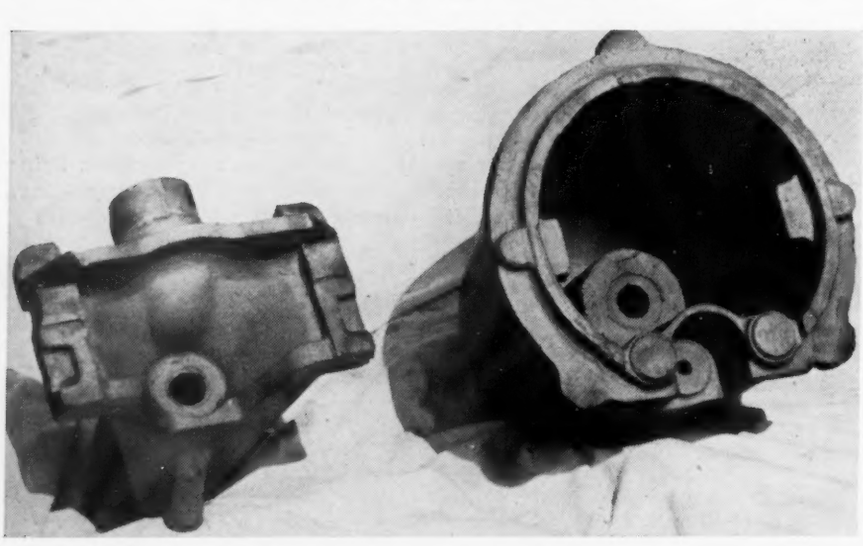
Gating Problems Discussed

Henry A. Jensen, General Electric Co., Lynn, Mass., discussed several problems of gating and showed a number of sectioned castings to illustrate his points.

"Application of Dust Control Principles to Foundry Operations," was the title of a paper presented by Ralph R. Meigs, assistant chief engineer, Liberty Mutual Insurance Co., Boston. He stressed importance of taking care of so-called little

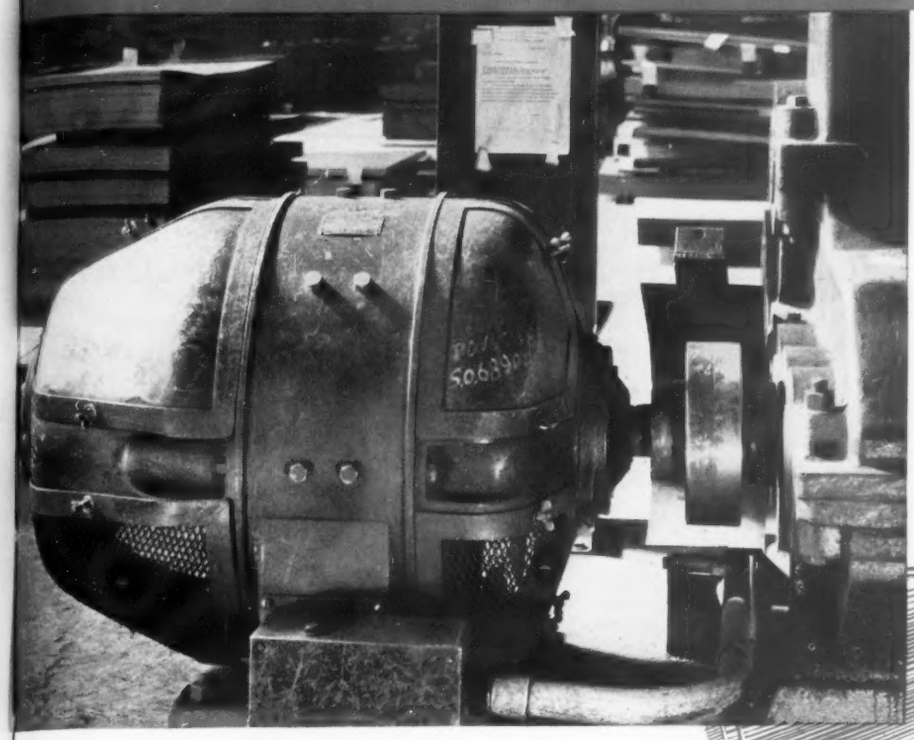
(*Please turn to Page* 62)

For Heavy-Duty Pumping



■ **These pump casings are made of cast iron containing 0.70 chromium and 0.20 nickel to resist severe pressures, temperatures and corrosion attacks encountered in pumping molten die casting metal. Photo courtesy Electro Metallurgical Co., 30 East Forty-second street, New York**

Special or Standard



G-E Type CD, 15/20-hp, 300/1200-rpm, 230-volt d-c motor driving slitter in an Indiana steel mill

G-E D-c Motors Are Built for Long Service in Steel Mills

THERE'S no one size or type of d-c motor that is a special favorite of G-E engineers. When you need a motor for *any* kind of adjustable-speed or start-stop service in your mill, consult General Electric, and you will get a drive that you can depend upon.

MILL AND INDUSTRIAL TYPES

On the tougher auxiliary jobs you will find that the G-E heavy-duty d-c mill motor (Type MD) will perform with dependability and low maintenance. More than 12,000 units in service attest its popularity. For less exacting jobs the G-E industrial-type d-c motor (Type CD) will give equally dependable service. It is available in a wide range of standard ratings, speeds, and enclosures.

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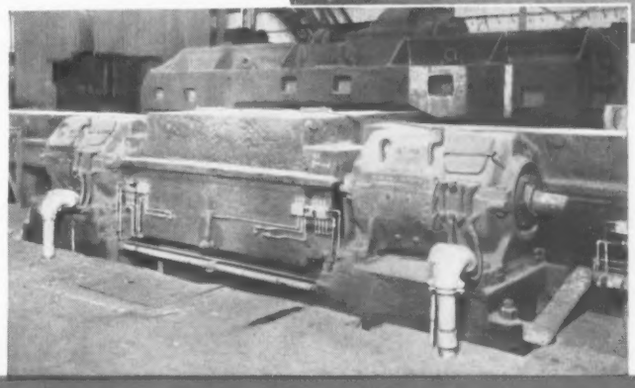
Do you need a special, off-standard drive? Again, General Electric is ready to help you—ready to furnish a motor of special rating, of any style of mounting, in any size from fractional-horsepower to 10,000-horsepower (or more).

Furthermore, every G-E motor can be furnished with control to match—an example of how complete coordination of electric equipment is obtained when General Electric assumes undivided responsibility. Call the nearest G-E representative for the complete story. General Electric, Schenectady, N. Y.

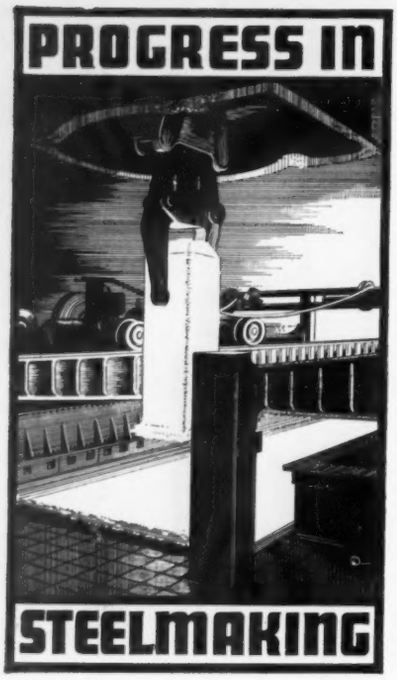
THERE IS ALWAYS A BETTER WAY

G-E 8000-hp, 40/100-rpm, 800-volt d-c motor driving main rolls in 44-inch reversing blooming-mill in Chicago area

Two G-E Type MD 150-hp, 450-rpm, 230-volt d-c mill motors driving rear table in an Indiana blooming mill



GENERAL ELECTRIC



Instrument Control

Recently developed automatic control systems, made possible by new instruments, offer many advantages in a wide field of applications. Three typical systems are presented

By R. TRAUTSCHOLD
Engineering Consultant
Caldwell, N. J.

■ USE OF automatic control mechanism in steel mills and metallurgical plants has doubtless been somewhat impeded by the multiplicity of instruments and control systems possible. As a result pyrometers, and similar instruments, are used principally as indicating agents rather than actual process controllers.

A noteworthy exception, however, is found in the great automotive plants where considerable progress has been made toward co-ordinated systems of control which time successive operations or processes so that the output of one is exactly balanced by the input requirements of the succeeding operation. This is the main object of mechanical process regulation or so-called "co-ordinated process control."

Full instrumentation of thermal processes in metal industries has not progressed rapidly because the advantages have not been fully realized and because of the excessive temperature tolerances that are often allowed in commercial practice. Gains from fully automatic control are often indirect so that its cost apparently is not justified. However, when indirect savings added by obtaining a higher grade product with decreased spoilage at faster rates are fully evaluated, the advantages are usually evident.

Bringing a steel treating oven to heat and holding precise temperatures with automatic control may even consume more gas or electricity than when hand controlled but the steel produced may be so much higher in quality and uniformity as to offset by far the added cost.

Case hardening and heat treating steels require somewhat complicated sequences, an accurate automatic control of which can greatly improve the quality and uniformity of the work. For instance, in case hardening for maximum case with minimum distortion, the steel may be given a preliminary heat to 1450 degrees Fahr., quenched in oil, with three subsequent reheats and quenches, each reheat being 50 to 100 degrees below the preceding. Result is a case about four times as hard as originally with the core tougher but little harder than before.

Protects Equipment

The importance of accurate control in this and similar heat-treating cycles cannot be underestimated. This, however, is but one instance where automatic control has demonstrated its value. Such control by instruments invariably protects equipment. It also furnishes records and information necessary for efficient direction and constitutes a guide to more efficient operation. It is usually welcomed by shop men as it provides relief from undue responsibility and materially lightens the arduousness of many types of work.

Controllers for gas producing machines, pickling tanks, blast furnaces and many other applications are advancing rapidly as new systems are developed. Although co-ordinated process control is still in a rather embryonic stage, definite progress has been made as indicated in the following examples:

A large midwestern automobile manufacturer who operates his own steel producing plants employs an interesting system which automatically controls the fuel-air ratio in blast furnace stoves. This sensi-

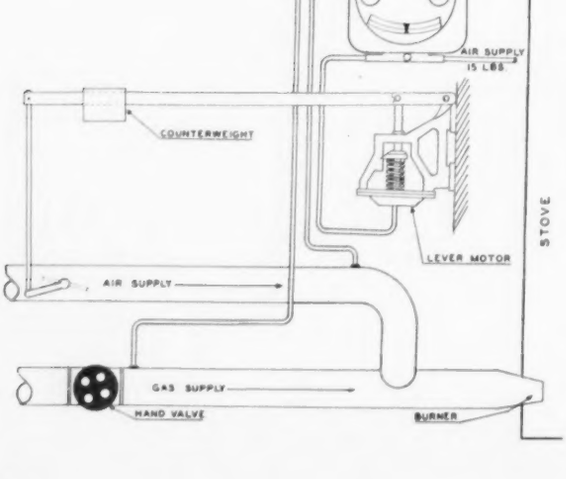


Fig. 1—Single valve, air-gas ratio control for blast furnace stove. Photo courtesy The Bristol Co.

tive control produces high combustion efficiency at any rate of firing by simply adjusting the gas supply valve, the air supply being automatically regulated.

Fig. 1 shows this system which is also suitable for automatic control of air-gas ratio on annealing furnaces or any other gas-fired furnace operated under forced draft. An air operated, differential pressure controller with two actuating elements is used. One actuating element is in the gas supply line, the other in the air supply line next to the burner. The differential controller is connected to a butterfly valve in the air supply through a lever motor and suitable whippletree linkage. Once the system is set or calibrated, any variation in the gas supply line produced by operating the handwheel instantly provides a compensating adjustment of the air volume to maintain the correct ratio for maximum combustion efficiency, thus assuring most economical and efficient consumption of gas under all conditions.

Maintenance Complicated

Maintenance of constant pressure on gas producing coke ovens to secure uniform quality of gas is more complicated. Periodic charging with fresh coal creates sharp fluctuations in oven pressures which are unavoidable. It also is necessary to prevent smoking when charging which further complicates the situation.

With the injecting of steam into the oven during charging a partial vacuum is created and is effective in preventing smoking but in doing so builds up a pressure on the gas collector main. This must immediately be relieved to hold the gas production rate uniform and to prevent a vacuum developing in the main. This relief is provided by automatically maintaining a suction on the crossover line from the coke ovens.

Fig. 2 shows a system which has been developed to satisfactorily handle the above problem. A large butterfly valve in the crossover main is operated by dual air cylinders which handle gradual as well as sharp pressure changes. A smaller supplementary butterfly valve is linked to the large one in such a manner that it operates only when the latter attains a two-thirds open position.

There is a pneumatic controller to govern the operation of the system. The double set of springs and the two double acting cylinders are necessary to provide for gradual changes as well as to accelerate pressure relief and to handle the increased drag imposed by the double valve movement in extended positions.

For slow valve manipulation, air operates the lower cylinder slowly closing the valve against spring tension. No air is admitted to either cylinder when pressure in the main is normal, spring tension bringing pistons to the neutral position.

For fast action to damp surges, the high-pressure jet of the controller is uncovered, applying full pressure to the top cylinder through a 3-way valve. When crossover main pressure becomes normal, this pressure is instantly removed and the piston returns to normal position as the 3-way control valve opens a by-pass leak.

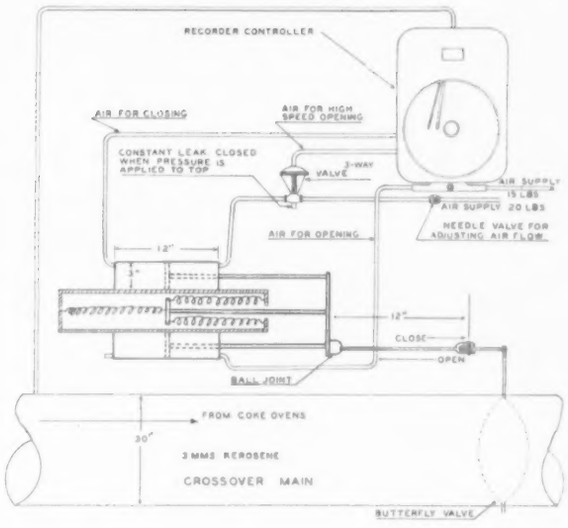


Fig. 2 — Pressure control operating in crossover main from coke ovens

Wide Adaptability

Another example showing the wide adaptability of these systems is one employed to vary the steam supply to turbines driving gas compressors to maintain automatically a constant pressure in the compressed gas line. Here a pneumatic pressure controller adjusts a 3-way pilot valve in the compressed air line to the turbine governors. This simple system is shown in Fig. 3 and is so sensitive that it takes care of the slightest fluctuation. Set at 18 pounds per square inch, it effectively limits pressure variations within ½-pound plus or minus.

These three examples are fairly typical of the jobs automatic control systems are doing to increase the efficiency of many widely varied types of operations. Familiarity with new instruments and the control systems they make possible daily becomes more necessary to plant operators who seek ways to decrease operating costs and to increase production or manufacturing efficiency.

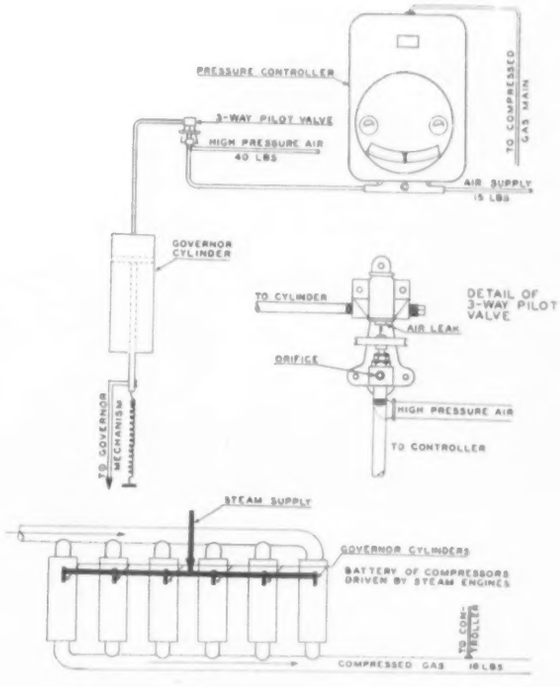


Fig. 3 — Automatic speed control of compressor turbines maintains output pressure constant

50% to 300% MORE POWER

Yet no greater box width or length

This 24-hour Bosch tank handling truck is equipped with relay sets of 30 C8's—always has ample power!

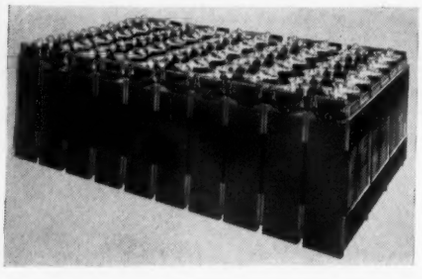
UNNOTICED, usually, but with great persistence, the duty imposed on industrial trucks everywhere is on the increase. RESULT: *trucks ample for their original duty cycle are under-batteried today.*

Have your trucks re-batteried in keeping with the new demands. Usually it is a simple procedure; and you need not wait till the batteries wear out, provided they're alkaline batteries.

One method is simply to substitute C-type batteries for A. One C battery in place of one A battery increases power capacity 50 per cent—two for relay increase it 300 per cent—without requiring a wider or longer box.

If this method doesn't apply, there are others. Ask us for recommendations.

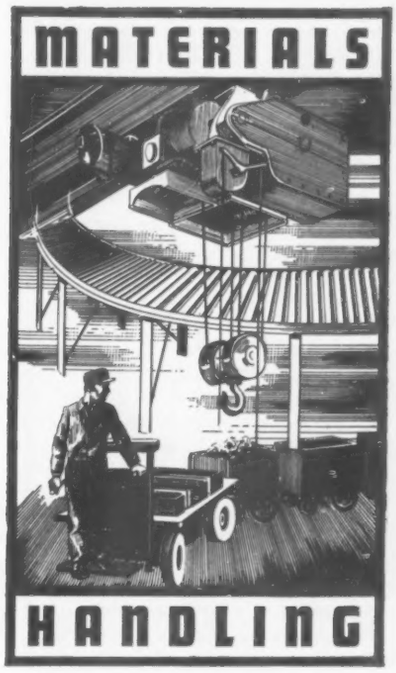
EDISON



STORAGE BATTERY

A steel storage battery—capacity 32.40 kilowatt hours—a big battery for a big job!

DIVISION OF THOMAS A. EDISON, INC.,
WEST ORANGE, NEW JERSEY, U.S.A.



Wire Rope

Recently approved standards specify rope of flexible plow steel and chain of steel electrically welded on the side of the link. All important details are covered

J. A. CRONIN, Materials Handling Editor

■ STANDARD specifications for wire rope electric hoists were approved recently by Electric Hoist Manufacturers' association.

In addition to provisions requiring that hoisting rope be of flexible plow steel, and that hoisting chain be of steel and electrically welded on the side of the link, the specifications cover all other important details of hoist construction. They include a six month guarantee against defective parts. Complete specifications as approved follow:

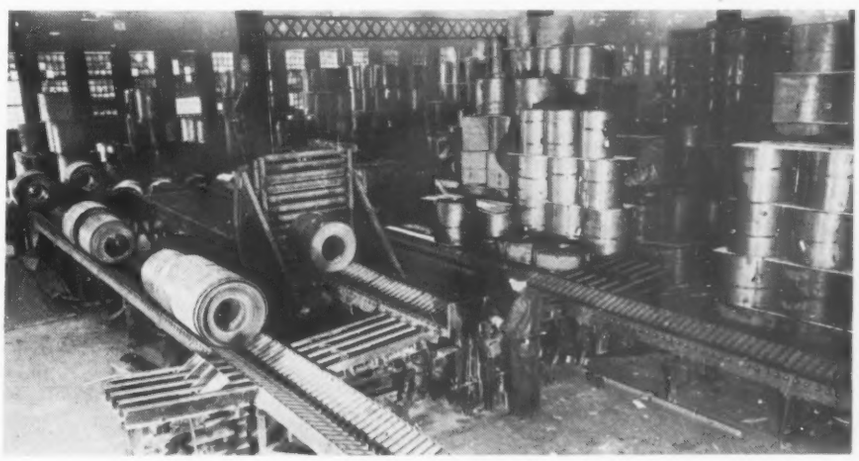
GENERAL: All apparatus covered by this specification shall be constructed in a thorough and workmanlike manner as is consistent with present standard practice. Due regard shall be given in design for safety of operation and durability of parts. All parts subject to frequent replacements shall be readily accessible and all replacement parts of the like kind shall be interchangeable. All materials used shall conform to the requirements of the latest specification of American Society for Testing Materials.

FACTORS OF SAFETY: Suitable allowance shall be made for journals subject to impact, and shafts shall be of sufficient size to allow a margin of safety for deflection. All parts shall be designed with a factor of safety of at least five.

MOTORS: Motors shall be of the enclosed reversible, intermittent-duty type, suitable for hoist service, capable of operation at loads and speeds specified without exceeding the following heat rating: After 15 minutes (or 30 minutes if service requires) continuous hoisting and lowering operation under full load, the temperature of any part of the motor shall not exceed a temperature rise of 55 degrees Cent. above the surrounding atmosphere. Motors may be ball bearing or sleeve bearing as specified by the hoist manufacturer. Motors shall meet the standardization specifications of American Institute of Electrical Engineers for intermittent-duty motors for this class of service.

CONTROLLERS: A separate controller shall be provided for each motor, adapted to start, stop and reverse, and give adequate speed control when the latter is specified. Operating parts of the controller shall be enclosed with suitable means for inspection and replacements. Controllers arranged for pendant cord operation shall have an automatic centering device to return controller to "off" position when cords are released. Resistor elements, when used, shall be protected and enclosed as is consistent with proper ventilation. They shall be designed for operation within a temperature rating of 375 degrees Cent. when wires are bare. When

Conveyors Handle Coils On Edge



■ **In this unusual conveyor setup steel coils are delivered from stock to the flat roller conveyor section. An operator tips the coil edge on double roller V-conveyor in center of this view. It then is transferred to either of two other lines also handling the coil on edge. Subsequently material goes to continuous pickling lines. Photo courtesy Standard Conveyor Co., North St. Paul, Minn.**

embedded resistance is used, maximum operating temperature will be 250 degrees Cent. in accordance with the standard of National Electrical Manufacturers' association. The temperature rise of the issuing air shall not exceed 175 degrees Cent. as measured by a mercury thermometer at a distance one inch from enclosure. Controllers for operation on direct current shall be equipped with suitable magnetic blowouts, where necessary to prevent injurious arcing. When magnetic control is required, push-button station shall be clearly marked, indicating the function of same.

HOIST GEARING: All spur gearing on wire rope hoists having either external or internal teeth shall be machine cut from either forged steel or cast steel blanks, or equal. All worm gears, when used, shall be of bronze with hardened steel worms. All chain drive gearing, when used, shall be steel, machine cut, with hardened sprockets. All gearing shall be fully enclosed and provided with means for ample lubrication. Adequate means shall be provided for inspection and replacement of any of the gearing mechanism.

BRAKES: An adequate braking mechanism shall be applied to the hoist to prevent overhauling of motor in the lowering direction. In addition there shall be furnished a motor brake designed to stop the rotation of the armature quickly and thus prevent excessive drifting of the load hook. This motor brake shall be capable of sustaining the load. It may be magnetically operated by means of a solenoid or mechanically operated in conjunction with the controller.

DRUMS: Drums on hoists of over 1-ton capacity shall be made of suitable material, shall be flanged or guarded and shall have adequate machined grooves to leave at least one wrap of cable in the groove when the hook is in the lowest position. The drums shall be capable of taking the entire amount of cable required for the lift without overwinding. When consistent with design the drum diameter shall be not less than twenty times the diameter of the cable.

BEARINGS: All bearings shall be lined with removable bushings or be of ball or roller type. They shall be of sufficient size to bring the pressure within safe limits for the loads and speeds specified.

LUBRICATION: Means for lubrication shall be provided to take care of all moving parts. Bath lubrication is preferred for all gearing and load brakes. All other parts may be lubricated by either oil or grease. Oil gages shall be conveniently located and readily accessible.

Prevents Overrunning

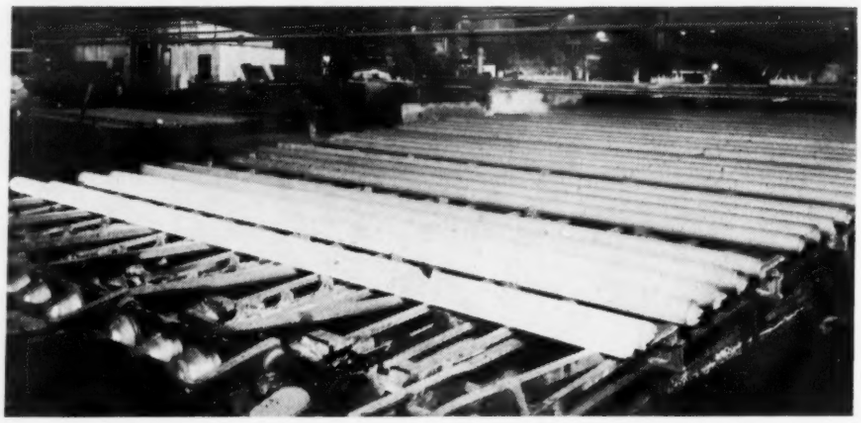
LIMIT SWITCH: Hoists shall be provided with automatic limit switch arranged to prevent overrunning of the load block in the hoisting direction by opening the electric hoisting current.

LOAD BLOCK: Load block for the wire rope hoist shall be preferably of structural steel or plate, cast steel or malleable, and so guarded that objects cannot fall into them. Proper guards shall be placed to prevent the hoisting ropes becoming displaced from sheave grooves. The load hook shall be forged from a tough and ductile steel and shall be arranged to swivel. Load hooks for hoists of over 3 tons capacity shall be equipped preferably with bearings, ball or roller type, on the swivel motion.

HOISTING ROPE: Hoisting rope

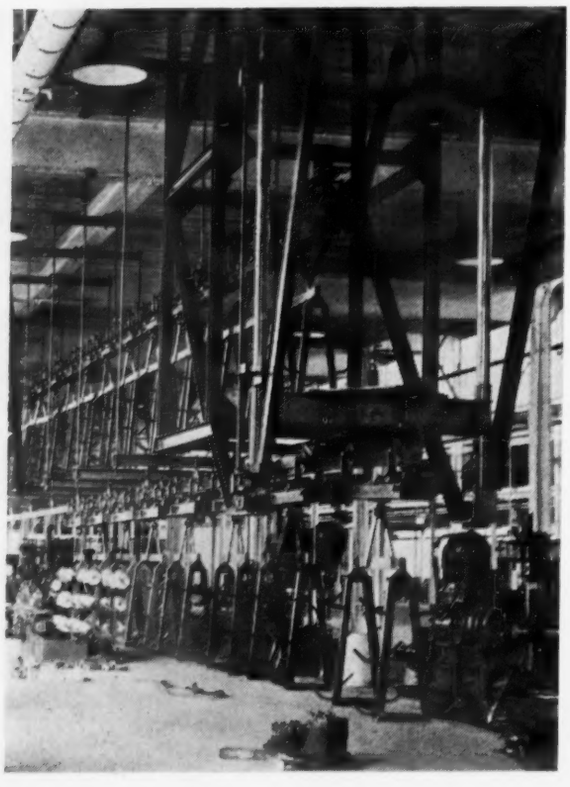
(*Please turn to Page 70*)

Cooling Rack Uses Chain Conveyor



■ **Continuous chains equipped with dogs push hot tubes along on this cooling rack in a tube mill. Photo courtesy Chain Belt Co., Milwaukee**

Monorail Has Overhead Return Line



■ **A system for manual transportation along a crankshaft fabrication line. Carriers are returned by gravity on the upper tier, using boosters. Photo courtesy American Monorail Co., Cleveland**

a 21-Year Endurance Race Against RUST!

— and this means Low-Cost Rust-Protection for your products

WAY back in 1916, United States Steel started a private war against rust. Thin, uncoated steel sheets of various kinds were exposed in a weather test to the salt air of Annapolis, Md. Twenty-one years later the copper steel sheets had definitely demonstrated their excellence and superior rust resistance in actual service.

Last year at the inventors' convention, *low-cost, rust-proof* steel was listed as one of the ten greatest needs of the country. While U·S·S Copper Steel is not *rust-proof*, it does have high resistance to rust and costs but little more than ordinary steel. For hundreds of products that are exposed to the outdoor air or corrosive atmosphere, U·S·S Copper Steel satisfies most practical needs. It would be a waste of natural resources not to use copper steel for such applications because it lasts from two to three times as long as plain steel.

If you make products that must withstand rust, such as air conditioners, tanks, garbage cans, steel windows, steel roofing, culverts, or transportation equipment, U·S·S Copper Steel offers advantages you can't afford to ignore. Call our nearest office or write direct to one of the companies below for complete information.

Ducts and air conditioning equipment **exposed to humidity need the extra rust protection of U·S·S Copper Steel. Under alternate wet and dry conditions, copper steel lasts two or three times as long as plain steel.**

U·S·S COPPER STEEL SHEETS

CARNEGIE-ILLINOIS STEEL CORPORATION, *Pittsburgh and Chicago*
COLUMBIA STEEL COMPANY, *San Francisco*
TENNESSEE COAL, IRON & RAILROAD COMPANY, *Birmingham*
United States Steel Products Company, New York, *Export Distributors*

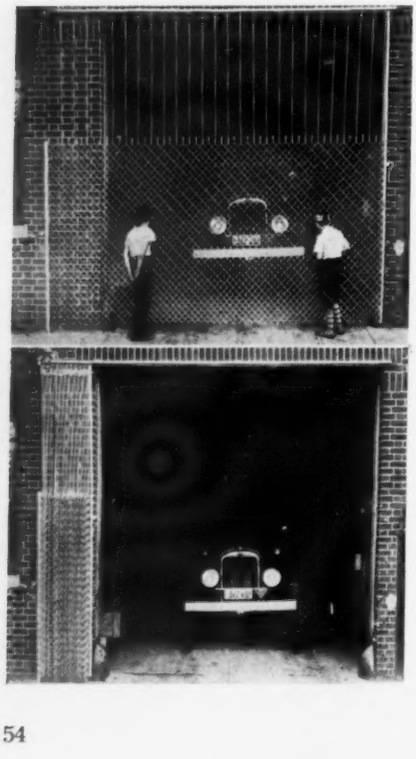
UNITED STATES STEEL

NEW METAL PRODUCTS

■ All-Steel-Equip Co., Aurora, Ill., has announced a complete new line of filing cabinets. The line, known as A-S-E Aurora files, includes a complete selection of standard sizes and drawer arrangements in standard, commercial utility and nonsuspension grades, plus a wide assortment of commonly used counter equipment. Cabinets are built on an improved, twistproof frame of six upright posts of heavy gage steel, tied into a compact unit by heavy steel drawer guides and cross members. Pressed steel torque plates, welded into corners of drawer openings, further insure against misalignment. Cases are of heavy gage, first quality furniture steel and finished in permanent, lustrous, chip-proof enamel baked on at high temperature. Colors are olive green, walnut, mahogany and oak.

■ Lockwood Hardware Mfg. Co., Fitchburg, Mass., now uses forged brass faces in place of sand castings on cylinder locks and on many bit key locks. Dead bolts and latch bolts also are forgings. A plastic material has been adopted for knob parts.

■ Illustrated is the new Cornell sliding grille, manufactured by Cornell Iron Works, Inc., Thirty-sixth avenue and Thirteenth street, Long Island City, N. Y. The sliding grille is a flexible steel curtain hung from an overhead track. Made of heavy galvanized chain link mesh, it is extended to any height of opening by galvanized vertical rods running to supporting track above. Grille will occupy small space when closed, less than 1/6th of the opening width. It will travel around a sharp curve and lie at a right angle to the opening if there is at least 10 inches of room from the edge of the opening jamb. A bottom track can be furnished if desired. Entire structure can be made of aluminum or stainless steel.

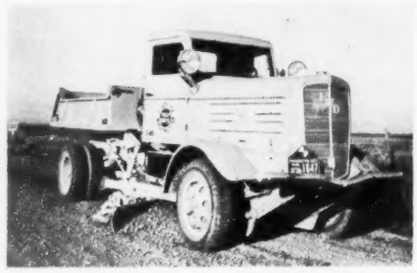


■ Vulcan Mfg. Co., Wabasha and Channel streets, St. Paul, recently placed on the market the Vulcan air cleaner service unit. For garages, dealers and service stations the unit fills a need for servicing air cleaners and restoring them to their original efficiency. The servicer is substantially built and finished in red or white. Height is four feet and weight approximately 37 pounds.

■ Something new in drilling equipment is the Sullivan Featherweight drill rig made by Sullivan Machinery Co., Claremont, N. H. It is mounted on steel wheels, rubber-tired, and has a tubular frame of rugged but light weight construction. Ease of moving the unit gives the flexibility of a hand-held drill yet the advantages of a heavy wagon drill.

■ An automatic stapler is a new product of Glendale Machine Works, 41916 San Fernando road, Glendale, Calif. Precision built of automotive quality parts, the unit has vibrationless flywheel, large capacity for standard staples, removable stapler heads and punch, and a constant-speed fractional-horsepower motor. Advantages of the machine are that it puts from one to three staples in any material from cellophane to cigar boxes, is faster and more uniform than hand methods, and is portable.

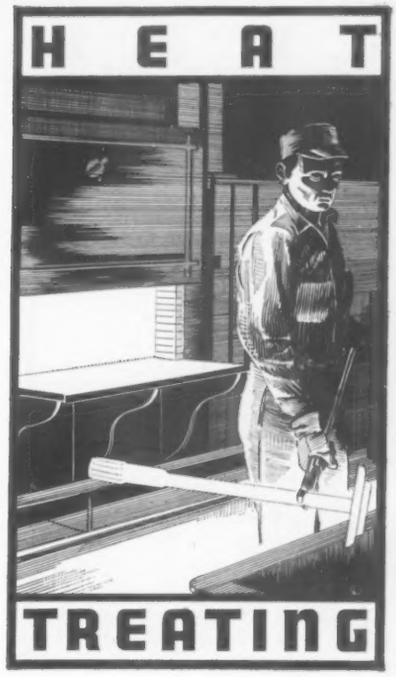
■ Redesigning has been done on the FWD four-wheel drive trucks manufactured by Four Wheel Drive Auto Co., Clintonville, Wis. Entire cab, fenders, hood and radiator have been changed to give a more pleasing appearance and a V-type windshield is also used. Fenders are skirted now and fuel tanks concealed under the skirting on the running boards. General construction principle remains but numerous mechanical refinements have also been made.



■ A new device designed to eliminate the telephone pole and overhead transmission of wires and cables has been developed by Northern Iowa Telephone Co., Cresco, Ia. The unit consists of a malleable iron standard to which panel boards are attached, a malleable iron base which is fastened to a concrete foundation, and a protecting cylindrical cover. The cable enters the container from conduits or covered trenches, and the cable ends are attached to the insulator panel. From the panels individual or group cables are taken underground to residences or business buildings.

■ With a new electric, motor-driven gate operator just announced by Kinnear Mfg. Co., 155 Fields avenue, Columbus, O., it is possible to open or close from remote control stations the sliding type of gate widely used on industrial premises. Momentary-contact control switch is provided with open, close and stop buttons which permit watchman to operate gate at approximate speed of two feet per second. Where special conditions require, other type controls, such as the key-operated, can be furnished.

■ O. B. McClintock Co., Minneapolis, has developed a counter cash protector for use in banks. The new unit is a steel drawer in a steel safe, which fits under a standard counter. Electric push-buttons are convenient to the teller's hand and a foot yoke is on the floor. Push-button automatically opens the money drawer, while use of foot-yoke makes it possible to keep the drawer open as long as is desired. In event of a holdup, teller can silently and without effort deposit the contents into a well-protected, timer-controlled safe below. A Bodine fractional-horsepower motor operates the unit.



Gas Carburizing

Modern practice, equipment and control for carburizing with natural gas, propane or butane make it possible to obtain, commercially, a high grade case

By L. D. GABLE and
E. S. ROWLAND*

Metallurgist and research metallurgist, respectively, Timken Roller Bearing Co., Canton, O.

■ EARLY WORK on gas carburizing by Timken Roller Bearing Co., Canton, O., was started early in 1913, soon after the results of Giolitti's investigations became available. It was apparent that if Giolitti's results were correct and gas carburizing could be developed on a commercial scale, it would be an ideal method for carburizing roller bearing parts, due to better control of the character of the case, elimination of packing small parts in compound and the dust and grime inevitably encountered when using solid carburizers. Availability of natural gas ideal for this purpose had much to do with the decision to begin work on this problem.

Early Apparatus

Experimental apparatus assembled for tests consisted of an old style, gas fired, high speed tool furnace used as a heating chamber with a heavy piece of cast iron pipe about 4 inches in diameter and 15 inches long as the retort. Tests were run using natural gas, carbon monoxide and methane and the temperature range from 1500 to 1800 degrees Fahr. investigated in steps of 25 degrees. In addition, the influence of time and rate of flow on the case depth and character were charted.

A furnace capable of carburizing on a commercial scale was next undertaken. The first unit consisted of a steel shell, 15 feet high and 10 feet in diameter, heavily lined with firebrick and tangentially fired with gas burners. Inside this heating chamber a vertical retort about 3 feet in diameter was constructed of firebrick, joined together with fireclay.

An average new retort performed satisfactorily the first two hours of a run after which fire clay between the bricks would begin to fall out. Thus the original problem of commercial gas carburization rapidly developed into a search for a gas tight retort. Many types of construction were tried.

Later, when the company again took up gas carburizing, the retort problem had been largely solved by the development of a non-porous, machinable, 1-piece heat resisting alloy. Also, the familiar horizontal, rotary, batch-type carburizing machine had been developed. From this time on, plant development progressed rapidly. In 1926, larger machines of the same type were put into operation and many improvements were made in the original machines during the next few years.

In 1931, Cowan published the experimental results which led to the development of the Eutectrol process of continuous gas carburizing. This unit consists essentially of a long, low, refractory lined steel shell which is both over and under fired. An alloy muffle, 31 inches wide and from 19 to 26 feet long, composed of flanged and bolted sections, runs through this furnace, the carburizing trays being pushed through the muffle on two sets of rollers and skids.

Enters from Top

Carburizing gas is introduced at several points along the top of the muffle and at the charging end, the amount introduced at each point of entry depending upon the character of the case desired. At both ends of the furnace, large, air-operated valves effectively seal the

Aisle between two rows of gas carburizing furnaces at Canton, O., plant of Timken Roller Bearing Co.

*Paper presented at A. S. M. carburizing symposium conducted during the nineteenth annual convention in Atlantic City, N. J., Oct. 18-22, 1937.

Carburizing Time Required for Various Case Depths

TABLE I

Case depth, inches	Type of steel	Carburizing temperature, deg. Fahr.	Carburizing time in hours		
			Gas	Diffusion	Total
0.030	SAE 4620	1700	3	1½	4½
0.045	SAE 4620	1700	5	2½	7½
0.070	SAE 4620	1700	14	7	21
0.060	Krupp	1650	10	5	15
0.075	Krupp	1650	18	9	27
0.100	Krupp	1650	28	14	42
0.125	Krupp	1650	48	24	72
0.185	Krupp	1650	70	35	105

muffle. Extensions of the muffle beyond these valves form two external chambers closed at their outer ends by lifting doors. The chamber at the charging end is used as a purging chamber in which all oxygen is expelled by means of flue gas. The corresponding chamber at the discharge end is used to produce any desired temperature of the work prior to quenching and to provide a short diffusion period.

A box-type, batch carburizing unit has been developed for the same applications as the cylindrical vertical furnaces. The brick lined shell contains a horizontal D-shaped muffle closed at the back end and fitted with a gas tight door at the front. Carburizing gas enters through several places along the side of the muffle.

No Two Alike

It can safely be said that no two commercial installations for gas carburizing are exactly alike. Differences consist of variations in design of equipment, carburizing gases used, details of manipulation, type of steel used and character of case desired. The gases being used at present for carburizing in commercial installations include raw natural gas, diluted natural gas, raw butane, diluted propane or butane, manufactured or city gas and others.

Closeup of rotary carburizing furnace showing charge of rings. Retort revolves to agitate charge, assuring uniform carburization

The system we employ, using raw natural gas, involves the following practice. The scrubbed gas is delivered at each carburizing furnace under a pressure of 6 ounces per square inch. Rate of flow to each furnace is regulated by placing a choker in the inlet pipe. Some operators of this type of equipment prefer flow meters and regulators but our gas pressure is sufficiently constant to make the above arrangement entirely satisfactory. All outlet pipes from the retort are fitted with a 5/16-inch diameter orifice, which maintains the gas under a slight pressure in the retort.

A carburizing temperature of 1650 degrees Fahr. for Krupp and 1700 degrees Fahr. for SAE 4620 steel is maintained within plus or minus 10 degrees in any one charge, from charge to charge and among the various furnaces as well.

This small spread in work temperature is maintained only at the price of eternal vigilance. Control thermocouples are placed in the combustion space to reduce temperature lag in operating; hence the control temperature is well above the retort and work temperature. Thermocouples and control instruments are checked at short intervals; all charges are checked for temperature before carburizing is begun by inserting a thermocouple through the outlet pipe; and the temperatures of all furnaces are measured with an optical pyrometer at least once in each 8-hour turn.

Sequence Standardized

The sequence of our operations in carburizing has been standardized with but few exceptions, regardless of the type of furnace. With the retort at temperature, a definite charge is placed in the furnace together with standard carburizing test rings of the same type of steel as the charge. From two to six rings are spaced through the charge and are later analyzed. Gas tight covers are securely fastened and the gas passed through the retort for 5 minutes in order to purge the retort of air. The gas outlet is then plugged with a tapered pin, the gas shut off and the charge allowed to come to temperature for a definite period. Temperature of the work is then checked and the gas turned on for the duration of the carburizing cycle. The gas outlet is again plugged, the gas turned off and the charge held at the carburizing temperature for the diffusion cycle, a period half as long as the carburizing time.

Times required to produce various case depths on both Krupp and SAE 4620 steel by this practice are given in Table I. In the large vertical furnaces where deep cases are produced on large parts and the diffusion periods are long, a gas period of 5 minutes at the standard rate is employed midway in the diffusion cycle as a safeguard against slight air infiltration.

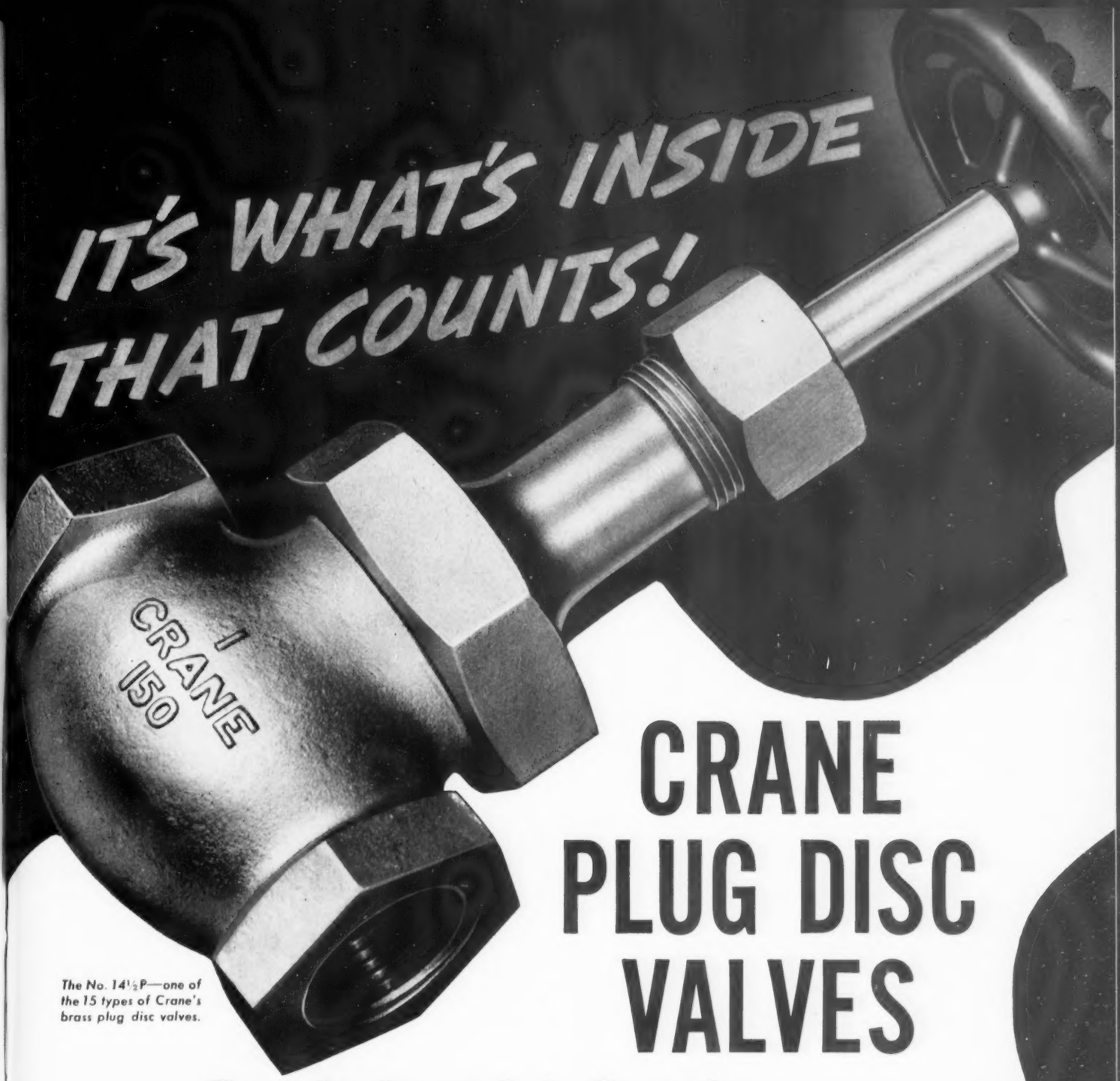
When the cycle is completed samples of the carburized material are taken from both ends and the middle of the charge, quenched in water and fractured for case depth measurement. Such fractures are etched in a solution of 20 per cent nitric acid in water and the light shaded area of the case is measured as the case depth. This depth corresponds to a point where the carbon content is between 0.40 and 0.50 per cent.

Controlled by Diluting

In diluted natural gas carburizing, the same control of carbon gradation and maximum carbon concentration in the case as produced by using raw natural gas with a subsequent diffusion period can be obtained by properly diluting the natural gas and eliminating the no-gas or diffusion period. The above factors are controlled by regulating the ratio of volume of natural gas to volume of diluent gas. In rotary machines and vertical furnaces, natural gas is usually diluted by mixing with air in a mixing machine. For box type batch operation or continuous furnace, DX unit is used to prepare from natural gas a burned gas of constant composition. In a typical box type batch installation, DX gas containing 8 per cent CO, 9 per cent H_2 and 4.5 per cent CO_2 is mixed with raw natural gas in the proportion of 40 cubic feet of natural gas to 60 cubic feet of DX gas per hour and fed to the muffle under a pressure of 1 inch of water. Gears made from SAE 3115 steel are given a 0.045-inch case in 6 hours at 1700 degrees Fahr.

Continuous furnace practice usually involves the use of DX gas containing from 1 to 3 per cent CO mixed with natural gas at a muffle pressure of 1 inch of water with a total flow of between 150 and 250 cubic feet per hour. The total flow used depends primarily upon the size and shape of the pieces being carburized.

On carbon and low alloy steel parts of medium size carburized at



The No. 14½P—one of the 15 types of Crane's brass plug disc valves.

CRANE PLUG DISC VALVES

For Industrial Service

Good to look at—but better to use—because quality in the Crane 14½P does not depend on superficial features. Its goodness is thorough. Backed by Crane experience and Crane engineering, the 14½P is built to do the kind of work that takes the life out of ordinary valves in short order. It's what's inside that counts most when a valve must operate in partly opened position, or when it is opened and closed often. That is why it will pay you to specify the Crane 14½P for throttling, for soot blower, blow-off, boiler feed, drip, and drain lines. Use the 14½P for services up to 150 lbs. S.W.P. at 450°F. Beyond that limit we recommend Nos. 212P and 382P. The details of design, materials, and construction that mean greater hidden values in Crane valves, are found in our booklet "The Inside Story of Crane Plug Type Disc Brass Valves." Get a copy. It's free. It tells a lot of vital facts about valve construction.

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NATION-WIDE SERVICE THROUGH 134 BRANCHES
AND MORE THAN 500 WHOLESALERS

1700 degrees Fahr., a 0.100-inch hypereutectoid case, 1.15 per cent C maximum with 50 per cent of eutectoid composition or higher, required about 60 per cent raw natural gas and 40 per cent DX gas at a total flow of 150 cubic feet per hour. A eutectoid case of the same depth requires a 1 to 1 ratio of natural gas to DX gas at the same rate of flow.

Gas Externally Heated

One continuous installation in operation at present uses a CG unit instead of the customary DX unit to prepare the diluent gas. In this unit a mixture of 70 cubic feet of air and 50 cubic feet of natural gas per hour is externally heated to 1840 degrees Fahr., cracking the natural gas to give a product of constant composition. The total flow of CG and natural gas to the muffle is 224 cubic feet per hour, of which 120 is CG gas and 104 is natural gas. This total flow of natural gas is added at each inlet in varying proportions. Ring gears of 4615 steel weighing 21 pounds each are carburized to a case depth of 0.045-inch total penetration at 1750 degrees Fahr., the daily production being 384 gears. The total time in the furnace is 6 hours. Raw natural gas as introduced in the holding chamber at the discharge end to prevent decarburization.

Propane or butane when used as the carburizing medium also employs some method of diluting these gases in practically all commercial installations. For rotary machines and vertical furnaces, they are generally mixed with air in a mixing machine. For continuous and box type batch furnaces, a CG unit is used to prepare a cracked gas for mixing purposes. In this unit, the hydrocarbon gas is diluted with air in the proportions of 1 part propane to 7 parts of air or 1 part butane to 10 parts of air and externally heated to a higher temperature than the carburizing temperature in order to crack the hydrocarbons without the formation of tar or soot. This gas is mixed with propane or butane at the inlets in the same way as when diluted natural gas is used.

Uses Mixed Gases

One typical installation of stationary vertical and horizontal rotary furnaces uses a mixed gas composed of one part by volume of propane and 2 parts by volume of air in carburizing SAE 1015 and 4620 steels at 1700 degrees Fahr.

With the furnace at temperature the charge is introduced and the gas, flowing at a rate of 100 cubic feet per hour, is passed through the retort for 10 minutes to purge the muffle of air. The gas is then turned off for 3 hours to permit the charge to come to temperature and again turned on for the carburizing cycle.

Case Depth vs. Time for 1:2 Propane-Air Mixtures

TABLE II

Case depth, inches	Type of furnace	Carburizing time at 1700 degrees Fahr. Gas	Diffusion	Total
0.050	Rotary	5½	..	5½
0.070	Rotary	7½	..	7½
0.100	Rotary	15½	..	15½
0.120	Rotary	19	.	19
0.100–0.115	Vertical	25	2	27
0.115–0.130	Vertical	27	2	29
0.125–0.140	Vertical	31	2	33
0.135–0.150	Vertical	35	2	37

A diffusion period of 2 hours is allowed, regardless of the length of the carburizing cycle.

In the rotary machine the same gas is used at a flow of 65 cubic feet per hour and the same cycle of operations employed except that only 1 hour is allowed for the charge to reach the carburizing temperature and no diffusion period is used. The carburizing and diffusion times, if any, for definite case depths, total carbon penetration, are given in Table II.

A typical continuous furnace in operation at present uses butane and air as the base gas cracked in a CG unit and raw propane as the enriching gas for carburizing medium sized parts of SAE 1015 and 4620 steel at 1700 degrees Fahr. A mixture of 140 cubic feet of air and 15.5 cubic feet of butane per hour is fed to the CG unit and partially burned or cracked at 1760 degrees Fahr. A total amount of 50 cubic feet per hour of propane is mixed with this gas at the various inlets.

Low Cost

The total time cycles required for various case depths, total penetration, are given in Table III. Heating time is included as well as a short period in the discharge chamber to allow the work to equalize at a temperature of 1500 degrees Fahr. before quenching.

Modern gas carburizing furnaces and machines are well designed units in which carburizing of high quality and uniformity can be done at low cost and in the shortest possible time. Control of the process consists of producing within commercial limits a constant depth of case, a uniform maximum concentration of carbon at the surface and a satisfactory gradation in carbon from case to core. The most important variables entering into the process are temperature, gas, time, steel and the human element.

Temperature is the most important in commercial operation because the entire process is dependent upon the rate of diffusion of carbon in austenite which, in turn, is dependent entirely on the temperature. The necessity for the most rigid control of the carburizing temperature cannot be too heavily stressed. If best results are to be obtained the temperature must be held within 10 degrees plus or minus. This figure includes variation through the charge as well as from charge to charge in the same furnace and from one furnace to another operating on the same product. This small variation can only be maintained by continual checking and adjustment of the equipment but it is felt that the effort will be repaid in results.

Variables Carefully Measured

Variables due to the gas include composition and rate of flow. Both should be carefully measured and held constant within as narrow limits as possible. Pressure affects the rate of flow and should be held constant for this reason. Gas pressure in the retort should be sufficient to prevent infiltration of air. Increasing the pressure beyond this point, however, is of no benefit unless the gas is so dilute that the rate of transfer of carbon to the steel is less than the rate of diffusion.

The effect of variation of time on the depth of case is much less important than that of temperature variation but it is of sufficient importance to force rigid adherence to the time cycle of operations. Control of this variable becomes difficult of attainment with the more complex operating cycles.

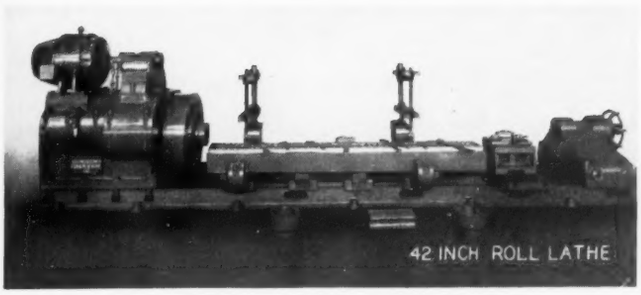
Both the analysis of the steel and the size of the austenite grains at the carburizing temperature have an effect on the case obtained. In general, the highly alloyed steels have a slower rate of carbon diffusion. Variations within the ordinary limits of analysis, however, produce some differences in the resultant case. Generally speaking,

Case Depth vs. Time Cycle in Continuous Furnace

TABLE III

CASE DEPTH vs. TIME CYCLE IN CONTINUOUS FURNACE

Case depth, inches	Total time cycle, hours
0.055–0.070	10
0.065–0.080	11
0.080–0.095	14
0.100–0.115	17
0.110–0.125	20



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Our modern heavy duty Roll Lathe built of extremely rugged construction for present day needs. Completely equipped with Timken Bearings throughout and positive circulating oil system.

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This high production type of scrubber, operating at speeds of 100 to 300 ft. per minute, employs high speed brush rolls having a longitudinal oscillating motion, eliminating brush streaks . . . All rolls are driven from separate drive box through universal couplings, and are anti-friction bearing equipped . . . Proper arrangement of auxiliary equipment permits this unit to bright pickle, scrub and dry previously wet pickled sheets and strips, or clean, scrub and dry hot rolled sheet and strip in the "as rolled" state or in a pickled, normalized or annealed condition.

• • •

ROLLS

SAND AND CHILLED SPECIAL ALLOYS

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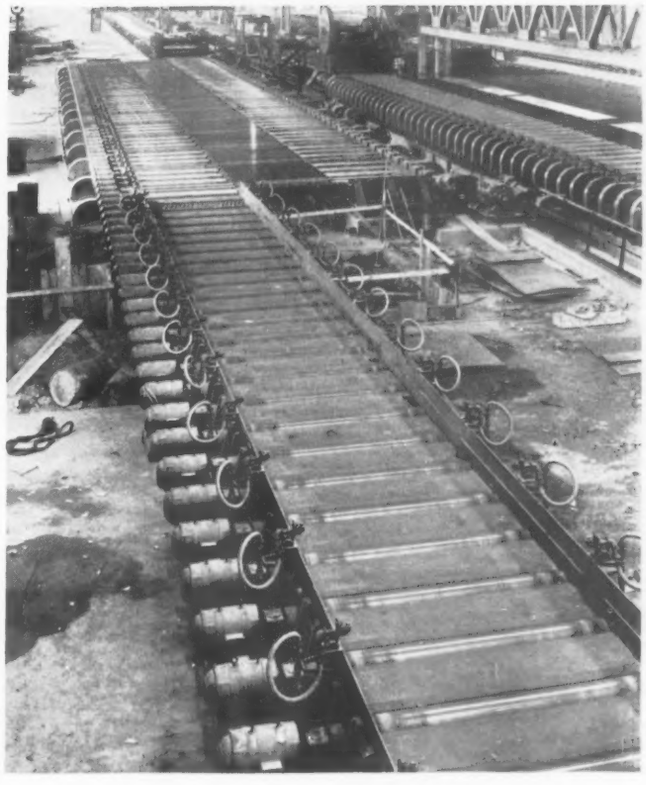
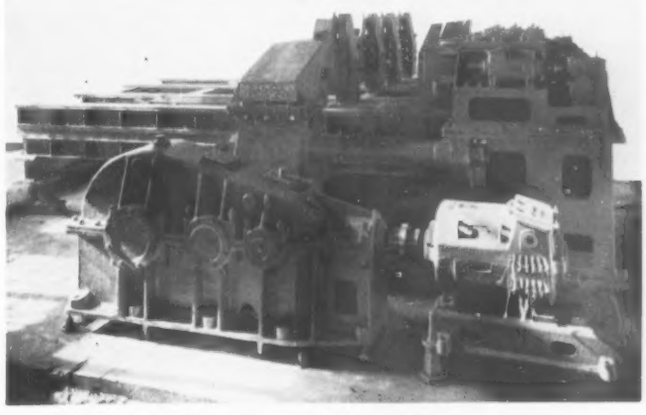


ROLLER TABLES

Hot plate finish is preserved unscratched because of highly ground, polished rolls and aprons . . . Direct Motor or enclosed bevel pinion drives through anti-friction bearings eliminate friction and power loss . . . Welded frames provide maximum rigidity.



DOUBLE FURNACE PUSHER

This represents our latest development in heavy Furnace Pushers for continuous furnaces . . . We build Pushers of all types and for all services.

Also Complete Equipment for

THE FINISHING END OF STRIP MILLS — TIN MILLS AND SHEET MILLS — ROLLING MILL MACHINERY
ROLL LATHES — STRAIGHTENING MACHINES — STRETCHER LEVELERS — SPIKE MACHINES
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The Youngstown Foundry & Machine Co.

Youngstown, Ohio

FIFTY YEARS OF SERVICE TO THE STEEL INDUSTRY

larger austenitic grain size means a greater rate of carbon penetration. The need of control of these variables is usually greater from the standpoint of the finished part than from that of the carburizing operation, but their effects in this regard should not be overlooked.

If carburization is carried out by the best commercial practice available, the variation in case depth should not exceed 0.010 of an inch plus or minus, for case depth of 0.030-inch or greater, but it cannot be maintained within much less than this variation over long periods. For example, if a part has a specified case depth of 0.030-inch, a minimum of 0.050-inch and a maximum of 0.070-inch should be acceptable and the case depth of all parts maintained within these limits.

Design of Castings

(*Concluded from Page* 40)

things in the development of any successful good housekeeping program in the foundry. He pointed out that molding and coremaking operations are relatively dust free. The major problem in these departments is to prevent contamination by entry of dust from adjoining areas. Shakeout operations usually are dusty and dust control measures depend largely on the type of foundry and local shop conditions. Shakeout operations should be conducted with a minimum number of persons working in the vicinity. Effective respiratory guards should be worn by persons so engaged. Exhaust ventilation should be installed in connection with any centralized shakeout station or stationary shakeout units. Sand handling or conditioning equipment involving dry sand should have adequate dust ventilation at all points where there is agitation or disturbance of the dry material.

Manfred Bowditch, director, division of occupational hygiene, department of labor and industries, Commonwealth of Massachusetts, Boston, stressed the need for confining sweeping and cleaning operations to other than regular working hours. In a recent foundry study, products of sweeping operations were found to account for more than one-third of the air-borne dust in a given period.

Harry W. Dietert, president, Harry W. Dietert Co., Detroit, talked on "Sand Control in the Foundry" and gave an interesting demonstration of sand testing methods and equipment. Hardness, permeability and flexibility of the mold must be controlled completely. In determining composition of sand, first control is for moisture, second for grain fineness and third for clay, where the percentage, green strength and dry strength are determined. Moisture control machines belong in the foundry so that quick tests can be made constantly. Both fineness and distribution of sand grains must be controlled. The speaker stated that if 60 to 75 per cent of the sand is retained on several adjacent sieves, the sand has been compounded well. If the amount retained on adjacent sieves is low the sand will present difficulties. The more sand grains retained on adjacent sieves, the better will be the permeability efficiency. Permeability equipment should be checked occasionally by the stop watch method. The testing demonstration covered both room and high temperature work on steel and iron molding sand as well as core sand. In one case Mr. Dietert showed the sintering properties of a sand sample. A high temperature furnace also was operated to duplicate conditions which the sand encounters in the mold.

Compression Strength Studied

D. L. Parker, General Electric Co., Lynn, Mass., and chairman of Subcommittee 6B-7 of the steel division of the American Foundrymen's association, presented a progress report of a study of compression strength, rate of breakdown and expansion-contraction properties of steel foundry sands at temperatures from atmospheric to 3000 degrees Fahr. To date the greater part of the research has been occupied in calibrating the various instruments used, exploring the heating zone of the furnace and running test specimens to check the procedures as set up by the committee members. This work has been completed and the actual tests now are being made.

Tests thus far run indicate accurate check results can be obtained. Curves plotted on tests made, showing strength and deformation against time, indicate that the initial sand tested breaks down at the end of 30 minutes at a temperature of 900 degrees Cent. This breakdown of strength holds steady for another 15 minutes and then starts to pick up until at the end of 60 minutes it is stronger than at any previous time. The committee feels an explanation of this property will be obtained when the tests have been completed and the structural differences of the sand determined, together with the effect of other base materials.

How Metal Airplanes Are Designed and Built

■ *Metal Airplane Structures*, by Major Flavius E. Loudy; cloth, 455 pages, 6 x 9 inches, 284 illustrations and charts, 68 tables; published by Norman W. Henley Publishing Co., New York; supplied by STEEL, Cleveland, for $5; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London.

A practical and authoritative treatise is presented on design and construction of the major component parts of various American and foreign airplanes. It is profusely illustrated with diagrams, tables and photographic reproductions showing important parts of the various types of planes.

It consists of 11 chapters covering types of metal airplanes, materials of construction, structural elements, welded joints, riveted joints, stressed skin design, types of metal wings, metal wing beams, wing design, fuselage design, hull and float design.

Battelle Announces Four Research Appointments

■ Four appointments as research associates are being made available at Battelle Memorial institute, Columbus, O., for the third consecutive year. These appointments are open to graduates of accredited colleges or universities. Preference will be given to men who have demonstrated marked aptitude for scientific research in their industrial experience or by graduate study in chemistry, physics, metallurgy or ceramics.

Appointments will be for one year and may be extended for a second year. Salary will be $1800 a year. Research associates will be expected to devote their entire time to work on a selected research project approved by the director and supervised by members of the technical staff. Research projects will be of fundamental or general character leading to publication of information useful to science and industry.

Detailed information can be obtained from Clyde E. Williams, director of the institute.

New Inks Will Stick to Glass, Porcelain, Metal

■ Inks for marking on glass, porcelain and metal have been developed by Westinghouse Electric & Mfg. Co., Pittsburgh.

Black and white inks available for marking on glass adhere to a surface when applied with a steel pen. These inks may be used in a vacuum chamber without interfering with conditions, and if set by application of a moderate temperature, cannot be removed completely by ordinary scraping. Both inks may be used on glass or porcelain for markings, such as on thermometers, or for decorative effects.

A silver monogram ink which may be applied with a rubber stamp has been developed for use in marking the W on Mazda lamps.

A. S. T. M. Announces Committees For Research and Standards

■ SINCE THE symposium on radiography and X-ray diffraction methods sponsored by American Society for Testing Materials in 1936, there has been need for research and standardization work on important problems in the field of radiographic testing. In order to carry out work in this field the society has organized a new committee designated E-7 on radiographic testing. The new committee will extend phases of the work heretofore carried out by Committee E-4 on metallography. Under Dr. H. H. Lester, Watertown Arsenal, in charge of developing preliminary plans for the committee, the committee was formally organized.

The general scope of the committee work is indicated by the subcommittees which are in course of formation. The committee expects to develop a formal statement of scope in the near future. It has been emphasized that the committee should work with similar groups in other societies and aim should be to co-operate, to correlate, but not to duplicate. In order to co-operate to best advantage, other radiographic committees are represented in the membership of Committee E-7.

Appoint Six More

The six subcommittees which are being appointed, together with the chairmen who will direct their work are as follows:

Subcommittee I on Radiography of Cast Metal—C. W. Briggs, American Foundrymen's association.

Subcommittee II on Technical Research—H. E. Seemann, Eastman Kodak Co.

Subcommittee III on Radiography of Welds and Weldments—H. H. Lester (temporary chairman), Watertown Arsenal.

Subcommittee IV on Correlated Abstracts—W. P. Davey, Pennsylvania State college.

Subcommittee V on Safety—E. W. Page, General Electric X-Ray Corp.

Subcommittee VI on Programs—Lars Thomassen, University of Michigan.

In addition to these subgroups, in view of the importance of starting work immediately on radiographic inspection of certain special products such as valves and fittings where castings, forgings and similar parts are welded, it was decided to organize a section of Subcommittee III to work in co-operation with Subcommittee I.

It has been decided to hold another meeting of the committee in June during the A. S. T. M. annual meeting in Atlantic City. At this meeting reports are to be presented by the subcommittees on correlated abstracts and on program. One of the main features of the meeting is to be a technical session at which there will be several papers presented on radiographic activities of direct interest to the work of the committee.

A number of outstanding authorities in the radiographic field were invited to become members of this new committee. The present personnel is as follows:

C. A. Adams, Edward G. Budd Mfg. Co.; Earnshaw Cook, American Brake Shoe & Foundry Co.; L. C. Wilson, American Chain & Cable Co.; C. W. Briggs, American Foundrymen's association; W. C. Hamilton, American Steel Foundries; J. C. Hodge, Babcock & Wilcox Co.; L. E. Abbott, Bell Telephone Laboratories; R. H. Frank, Bonney-Floyd Co.; E. C. Chapman, Combustion Engineering Co., Hedges-Walsh-Weidner division; J. J. Curran, Walworth Co.; P. D. Field, Bethlehem Shipbuilding Corp.; D. M. McCutcheon, Ford Motor Co.; G. C. McCormick, General Alloys Co.; W. G. Conant, General Electric Co.; B. B. Wescott, Gulf Research & Development Co.; Victor Hicks, Westinghouse X-ray Co.; H. R. Isenburger, St. John X-ray Service; G. F. Jenks, U. S. Army, ordnance department; A. Kidd, M. W. Kellogg Co.; Fred Grotts, Lebanon Steel Foundry; H. H. Lester, Watertown Arsenal; J. P. Magos, Crane Co.; V. T. Malcolm, Chapman Valve Mfg. Co.; A. G. L. Barkow, Maryland Casualty Co.; P. E. McKinney, Bethlehem Steel Co. Inc.; N. L. Mochel, Westinghouse Electric & Mfg. Co.; J. T. Norton, Massachusetts Institute of Technology; E. H. Mebs, Ohio Steel Foundry Co.; E. W. Page, General Electric X-ray Corp.; Alexander Gobus, Lucius Pitkin Inc.; H. E. Seemann, Eastman Kodak Co.; G. C. Dick, Shell Petroleum Corp.; C. W. Wheatley, A. O. Smith Corp.; F. C. Fyke, Standard Oil Development Co.; J. H. Hall, Steel Founder's Society of America; Lars Thomassen, University of Michigan; C. O. Burgess, Union Carbide & Carbon Research Laboratories; U. S. Navy, officer of bureau of engineering, specification section, design division; K. R. Van Horn, Aluminum Co. of America; W. P. Davey, Pennsylvania State College; G. E. Doan, Lehigh University; R. A. Gezelius, Taylor-Wharton Iron & Steel Co.; and N. A. Hahn, U. S. Navy Yard, Brooklyn.

The personnel of the several subcommittees which are being organized will be made up of members of the main committee.

Dr. Lester has been elected per-

Fabricates Stainless Steel Ice Chipper

■ **An automatic ice chipping machine fabricated of Enduro stainless steel, a product of Republic Steel Corp., Cleveland, is one solution to the problem of dispensing ice at bars and soda fountains. Unit, which is made by Service Devices Inc., New York' has an ice capacity of 10 pounds and weighs 29 pounds**

manent chairman of the new committee and Mr. Earnshaw Cook, American Brake Shoe & Foundry Co., was chosen as the secretary.

For work in the field of thermal insulating materials, the society also has organized a new standing committee designated C-16 on thermal insulating materials.

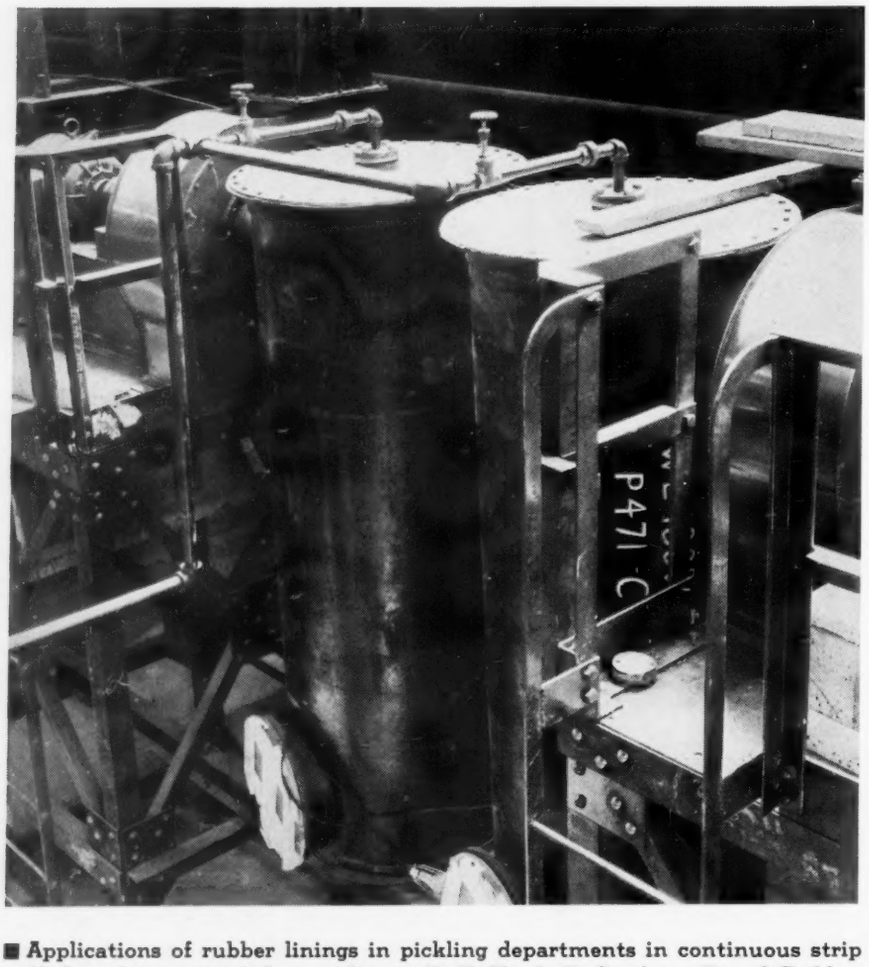
A subcommittee organization will be developed to handle the various tests. Temporary officers were elected at the meeting, including J. H. Walker, chairman, and E. T. Cope, secretary.

The present personnel of the committee is as follows:

E. A. Allcut, University of Toronto; W. A. Danielson and F. C. Houghten, American Society of Heating and Ventilating Engineers; R. H. Heilman, American Society of Mechanical Engineers; A. B. Bagsar, Sun Oil Co.; H. W. Greider, Philip Carey Mfg. Co.; H. C. Dickinson, national bureau of standards; E. T. Cope (temporary secretary), Edison Electric Institute; R. T. Girard, General Electric Co.; C. B. Bradley, Johns-Manville Corp.; William Morris, Keasbey & Mattison Co.; C. B. Wilkes, Massachusetts Institute of Technology; A. L. Simison, Owens-Illinois Glass Co.; J. C. Peebles, Armour Institute of Technology; M. L. Carr, Pittsburgh Testing Laboratory; J. E. Kennedy, Plant Rubber & Asbestos Works; E. R. Queer, Pennsylvania State College; Andrew LeBailly, Sargent & Lundy, Inc.; B. A. Hollenbeck, Standard Oil Development Co.; R. E. Cryor, Union Asbestos & Rubber Co.; U. S. Navy, Officer-in-Charge of the specification section, design division, bureau of engineering, and Director, engineering experiment station, Annapolis; J. H. Walker (temporary chairman), Detroit Edison Co.; and N. L. Mochel, Westinghouse Electric & Mfg. Co.

It is expected that this personnel will be augmented as the work of the committee gets under way since there is very great interest in this subject.

Rubber Applied in Pickling Departments



■ **Applications of rubber linings in pickling departments in continuous strip mills have been extended, according to N. E. Kimball, Goodyear Tire & Rubber Co., Inc., Akron, O. In addition to tanks, hoods, fume ducts, scrubbers, sewer pipes and accessories to these units, apparatus beyond the water spray now is being rubber lined. After the acid has been washed out of the fumes and the acidified wash water sent on its way to the sewer system by means of rubber lined piping, the scrubbed air enters a rubber-lined fan unit and is discharged into a rubber lined stack or outlet. Shown in the illustration are rubber lined scrubbers, fans and stacks**

Bituminous Coatings for Underground Service

■ Published by the national bureau of standards, Washington, as research paper RP1058, a 44-page booklet summarizes the result of a series of studies of bituminous coatings for pipe lines. The paper interprets the data obtained and covers nine types of coatings, several varieties of each being tested.

The data indicate that the same degree of protection for a pipe line can be secured in a number of ways. Only two coatings were outstanding and these were not perfect nor are they in general use. It was found most coatings, even though imperfect, afford sufficient protection to justify their application to pipe lines exposed to corrosive soil. Among the generalizations which seem warranted by the results of the tests are the following:

Soil characteristics such as corrosiveness, shrinkage and relative density greatly affect coating behavior. Effectiveness of a bitumen coating depends largely upon its thickness. Application of coatings by means of a sling generally results in imperfect coatings. Shields and reinforcements greatly reduce depth of the deepest pit during first few years of exposure.

Although no coating tested completely prevented corrosion under all coil conditions for as long as four years, almost all of them materially reduced the loss of metal during the period of test.

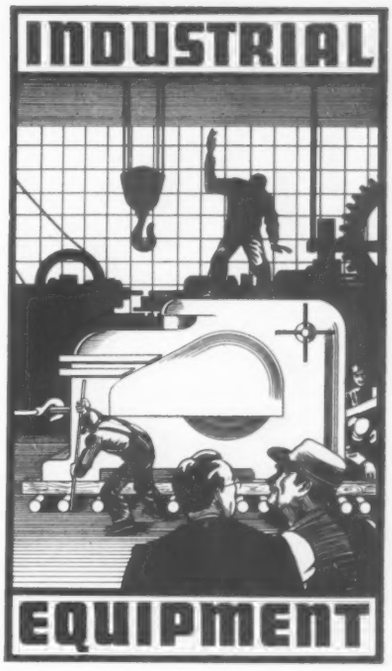
Sales Manual Issued By Enamel Institute

■ An effective book entitled "How to Increase Your Sales" has just been published by the Porcelain Enamel institute, 612 N. Michigan avenue, Chicago.

"Getting a raise is serious business," is the book's opening statement, and it is pointed out that porcelain enamel can help every home appliance salesman increase both the number of units sold and the unit value for each sale.

Devoting much space to women buyers, the book emphasizes and amplifies such statements as: "Selling is the job of making the prospect understand his need for what you have to sell" and "Price selling is the apology business demands for buyers' mistakes and for salesmen's laziness and inefficiency."

Such chapters as "The Right Slant on Salesmanship," "Licking the Price Problem," "How to Handle Objections," "Find that Missing Buying Decision" and "How to Close" are a few of the outstanding features. Sample copies of the book may be obtained without charge from the institute.



Squeeze Riveter Sets Rivets Cold

■ Hanna Engineering Works, Chicago, has developed a new lightweight, portable, pneumatic squeeze riveter for setting ¼-inch and 5/16-inch rivets cold.

As illustrated, it may be used for setting vertical rivets or rotated for

Suspension bail on this Hanna portable pneumatic squeeze riveter permits the use of the unit in any position

driving horizontal rivets. The complete machine weighs less than 100 pounds and may be suspended from a balancer to provide all vertical movement.

A universal suspension bail permits the use of the riveter in any position. It can also be tilted from side to side to more easily enter some work. The operating valve is in the rear cylinder head and is used to guide the riveter. After completing the power stroke the valve automatically reverses, returning the dies to the open position ready for the next rivet.

An operating speed of 50 strokes per minute and the compactness of the riveter assure maximum riveting speed. The yoke may be of whatever design and reach needed to fit the job.

Electrode Holder Has Replaceable Jaws

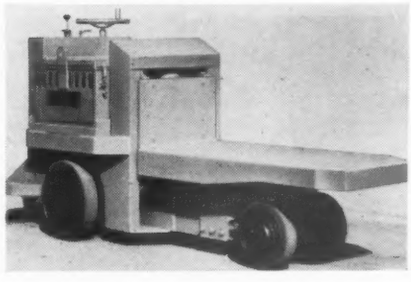
■ Delong-Cramer Co., Southgate, Calif., has placed on the market an electrode holder fitted with replaceable jaws. Design of jaws permits quick insertion of rods in any position.

Electrode is made in three sizes to take rods from 1/16 to ⅜ inches in diameter. Handle is air-cooled and has a fiber heat-shield that protects the operator and prevents a short circuit if the tool is laid down. Holders are balanced and light in weight, the heaviest weighing 22 ounces. The tool is equipped with a combination cable connection which permits either soldering or clamping. Jaws are made of heat-treated spring steel with serrated faces to prevent electrodes from slipping.

Elevating Truck Has 6000-pound Lift

■ Mercury Mfg. Co, 4118 South Halsted street, Chicago, has introduced a new model in its line of industrial trucks. This machine is of 6000-pound capacity and has a platform 27 inches wide by 66 inches long, lowering to a maximum height of 18 inches and raising to a maximum height of 24 inches above the ground.

The trail axle wheels are size 15 by 5-inch rubber tired and the drive wheels are size 20 by 5-inch rubber tired. Drive axle is of the double reduction spiral bevel and spur gear



Mercury low-lift elevating platform truck of 6000-pound capacity is shown with platform at its maximum height above the ground

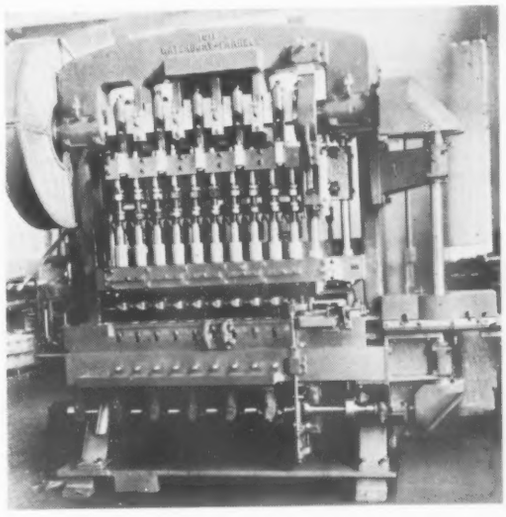
type. Steering is of horizontally disposed wheel type with Ross gear disposed at the base of the vertical steering shaft.

Snap-action contactor controller provides three travel speeds forward and reverse. Platform elevation is accomplished by hydraulic means. The battery power assembly is housed in a demountable box compartment permitting quick removal and replacement. The truck will accommodate either battery box compartment or gas-electric unit.

Crank Eyelet Machines Supplement Cam Type

■ Waterbury Farrel Foundry & Machine Co., Waterbury, Conn., has developed a series of crank eyelet machines of the multiple plunger type to supplement their line of cam eyelet machines.

These machines are built in three standard sizes. They are furnished with either 7, 9 or 11 plungers, a roll feed which pulls the metal through from the coil holder or floor reel in front and a finger motion in case a second or third row



Waterbury crank eyelet machine operates at a speed of 50 strokes per minute on ordinary brass. It has a maximum stroke of 8 inches and weighs 24,225 pounds

is to be cut from the coil. After a blank has been cut it is automatically carried to the cupping station which is provided with a blank holder. The cup is knocked out of the die and lifted into a transfer slide equipped with snap fingers for carrying the cup to the third and successive stations for the drawing and forming operations.

Power for performing the work is applied through cranks to a 2-rod guided gate or slide which transmits a down pressure to the plungers. Top bearing of each plunger is provided with a heavy compensator spring for the purpose of removing the shock load when starting.

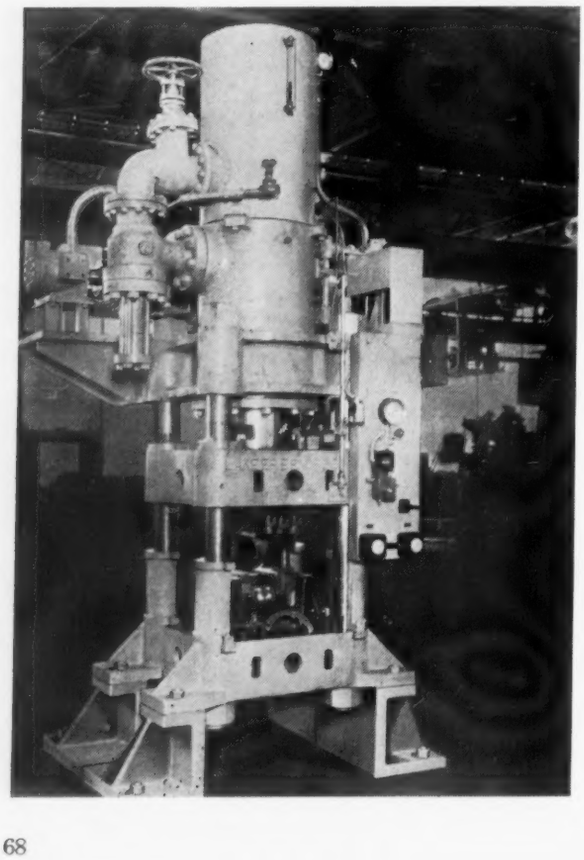
Crankshaft for the machine is 3⅞ inches in diameter. Maximum width of metal acted upon is 3⅞ inches for a single row and 7¼ inches for a double row. The press has a maximum stroke of 8 inches, and operates at a speed of 50 strokes per minute on ordinary brass.

Performs High Speed Stamping and Coining

■ Lake Erie Engineering Corp., Buffalo, has placed on the market a 300-ton, high speed press which was designed for operation up to 20-ton inch strokes per minute at full tonnage.

Press is suited for a variety of production purposes but especially for stamping and coining. Control of power, speed and pressure have been engineered into sensitive and conviently located controls. Selector control permits operator to choose jog, single cycle or continuous operation. Control of these three ranges of operation is by two push buttons located on the control panel. Pressure of the press is adjustable up to the full 300 tons.

Maximum adjustable stroke is 12 inches. Distances between columns R-L and F-B are 24 and 36 inches respectively. The full opening is 27½ inches.



Selector control on this Lake Erie, 300-ton high speed press permits operator to choose jog, single cycle or continuous operation

Loads Are Lifted From Either Side

■ Barrett-Cravens Co., 3255 West Thirtieth street, Chicago, has placed on the market a Jackit truck which

As illustrated Barrett-Cravens jack is wheeled into the lifting horn of the skid, then a downward motion of the handle lifts the two skid legs off the floor

can lift loads from either side from an angle of 75 degrees.

In operating the truck the operator merely wheels the lift jack into the lifting horn of the skid. Then with a downward motion of the handle he lifts the two skid legs clear of the floor. A latch holds it securely locked in this position. In lowering the skid, towing handle is lowered toward the floor, releasing the latch and permitting the loaded skid to settle down gently.

Unit is of steel bound construction with welded legs. Top boards are of maple and run the width of the skid. Wheels are 9 inches in diameter and may be supplied in either the chilled iron or rubber tired type. Weight of entire unit is 64 pounds.

Voltmeter Used With Tong Test

■ Columbia Electric Mfg. Co., 4519 Hamilton avenue, Cleveland, has placed on the market a voltage attachment which can be used in conjunction with the tong test. Unit which is known as the Voltor will enable operator to measure both alternating and direct current voltages up to 600 volts.

The voltmeter affords the user three full ranges: 0.150, 0.300 and 0.600 volts. These ranges are easily changed by setting the rotary switch. Unit is designed for use with any existing 50 ampere element of either the type A or AX tong test or 75 ampere element of the type B or C. It is small enough to be carried in the pocket and weighs 9 ounces.

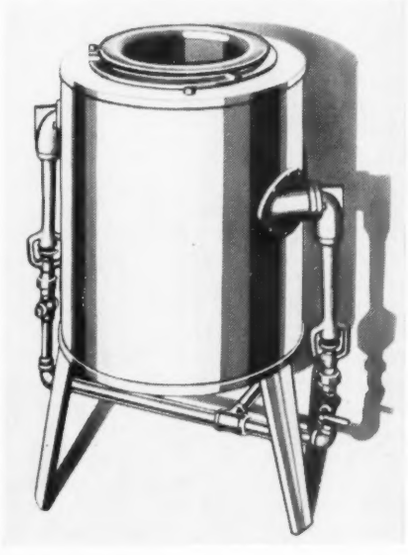
In using the Voltor, operator connects the two leads to the line and closes the tongs of the tong test about the opening in the Voltor. An indication on the tong test element is obtained which is proportional to the voltage of circuit under test. Reading of tong test ele-

Columbia voltage attachment which can be used in conjunction with the tong test weighs 9 ounces and is small enough to be carried about in a pocket

ment is converted into volts by referring to chart on the side of the Voltor. Chart is simply a ready means of converting reading of tong test element into volts.

Furnace Requires No Auxiliary Air

■ A. F. Holden Co., New Haven, Conn., has placed on the market a small gas furnace which requires



This Holden gas furnace can be used for tempering steel, carburizing or any heat treating bath within its temperature range

no auxiliary air and can be successfully used for case hardening or for heat treatment on tools.

Temperatures are reached from 300 degrees Fahr., for tempering steel, up to 1650 degrees Fahr. for carburizing or any heat treating bath within this range of temperature.

The furnace is built in sizes to take 8 x 12, 10 x 14 and 12 x 16-inch pots. Price of the unit including automatic controls ranges from $300 for the smaller sizes to $416 for the larger sizes. This range of price combined with the low cost of operating enables small shop owners to profit with this equipment.

Lifting Magnet Is Light and Compact

■ Electric Controller & Mfg. Co., Cleveland, has placed on the market an electric lifting magnet designed especially for handling finished coils of cold rolled strip in rolling mills.

Unlike standard circular magnets in which the mass of metal of the magnet is over the hole in the coil, this new magnet combines compactness and small weight with the lifting ability concentrated strictly on amount of weight to be lifted.

Regarding lifting power, one of these magnets will lift a 10,000-pound coil having a maximum outside diameter of 45 inches it is claimed. In construction, the outer shell of these magnets protecting the coil windings are made of a non-magnetic material to avoid loss of magnetic flux. Material used for this construction is nickel-copper-chromium cast iron.

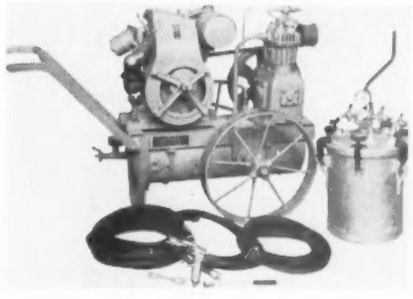
Floor Truck Has Arc-Welded Frame

■ Lewis Shepard Co., 245 Walnut street, Watertown, Mass., has introduced a floor truck having an arc-welded frame of double side girders with a capacity of 4000 pounds.

Side girders of the truck hold the hardwood top in place with a vise-like grip, eliminating the use of bolts. T-type, steel end protection saves top wood from being chewed through rough usage. Casters of the unit are hung on four steel arch sections which allow a large kick space.

Carries Spray Outfits

■ Binks Mfg. Co., 3114 Carroll avenue, Chicago, has placed on the market several varieties of mounting units for its portable paint spraying compressors.



Binks hand cart type mounting unit is available with steel wheels or pneumatic tires

Illustrated is the 2-wheel hand cart type. It can be furnished with steel wheels or pneumatic tires. The unit is available for spray outfits equipped with electric or gasoline motors from 1½ to 6 horsepower.

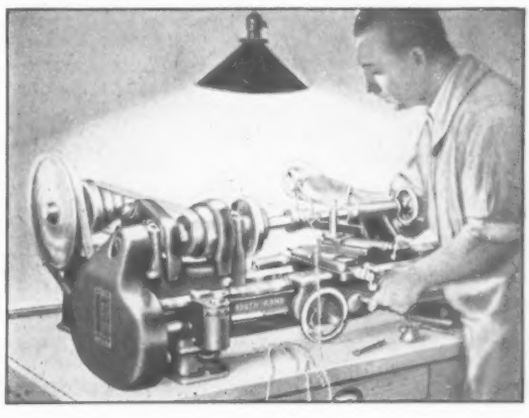
Shop Precision Lathe Offered in Seven Types

■ South Bend Lathe Works, 425 East Madison street, South Bend, Ind., has introduced a new 9-inch workshop precision lathe which is equipped to cut screw threads from 4 to 112 threads per inch, including 11½-inch pipe thread, and has power longitudinal feeds of 0.002 to 0.015 per revolution per minute. Lathe is offered in seven different types to fit a variety of installations.

Unit has a simplified twin gear reverse for cutting right and left-hand screw threads. Included also is an improved back-geared headstock with adjustable and larger spindle bearings and a ball thrust bearing on the ¾-inch hollow steel spindle. The lathe also is equipped with a heavier designed saddle, adjustable gibs on the cross feed and compound rest and a precision lead screw for cutting screw threads on master taps and precision thread gages. All gear teeth are precision cut from solid steel or semisteel blanks.

Different types of the 9-inch workshop lathes include the new 12-speed lathe, the adjustable horizontal motor driven bench lathe, pedestal adjustable, motor driven floor leg lathe, double friction countershaft driven lathe, the swing raising block lathe and the tool room lathe with draw-in collet chuck, graduated taper attachment, thread dail indicator, micrometer carriage stop and chip pan.

To insure precision on all machining operations, the one-piece cast, semisteel lathe bed has prismatic V-ways handscraped to provide a fine bearing surface and assuring permanent alignment of headstock, tailstock and carriage. More than 35 attachments may be fitted to the new lathe to increase its range of operation, it is claimed.



South Bend precision lathe has prismatic V-ways, handscraped to provide a fine bearing surface and assuring permanent alignment of headstock, tailstock and carriage

Wire Rope

(*Concluded from Page 50*)

shall be fabricated of the prescribed flexible plow steel.

HOISTING CHAIN: Chain when used shall be of steel and electrically welded on the side of the link. It must be uniformly shaped, accurate in pitch and outside dimensions of the links.

WIRING: Each hoist shall be completely wired by the manufacturer. Wire and wire sizes shall comply with the requirements of the National Electrical Code.

CAPACITY: The rated capacity of the hoist shall be marked in a conspicuous place.

GUARANTEE: If within a period of six months from date of shipment parts are found defective by our inspection, new parts will be shipped free of charge, provided the machine has been given normal and proper usage and is still the property of the one making the purchase.

CLEVELAND TRAMRAIL MATERIALS HANDLING EQUIPMENT

• A cab controlled motor operated carrier, hoist and grab enable one operator to pick up or deposit tote boxes as required.

ALSO BUILDERS OF CLEVELAND CRANES FOR EVERY INDUSTRY

CLEVELAND TRAMRAIL
Division of
THE CLEVELAND CRANE & ENGINEERING CO.
1125 Depot St.
WICKLIFFE, OHIO

Or consult your phone directory under Cleveland Tramrail.

Designs New Unit For Better Storage

Notable advances have been made in the past few years in better utilization of building space, both in production and in storage departments of industry.

As one manufacturer of materials handling equipment in a recent catalog expressed it: "The 'air rights' in your factory cost nothing, yet represent tremendous value to you."

One of the many ways in which these existing "air rights" are being given additional value is by using tiering storage units of various types. By stacking them in multiple units, additional storage space is made available. Recognizing a growing need for equipment which will aid in this direction, one manufacturer of pressed steel skids has added to his line a new design of tiering boxes developed for operation with electric fork trucks. In addition, this same manufacturer has designed a new box-truck providing floor mobility as well as a stacking feature and ability to be operated with fork trucks. Three new designs of pallets, including both all-steel and wood-steel combinations, round out this line, giving similar service to that of skid platforms, permitting the added feature of use of additional air space in handling and storage of materials to much greater extent than ordinarily available.

♦

Expenses for unnecessary maintenance resulting from improper care, incorrect application or poor selection of equipment, comes out of profits and cannot be spent for real improvements or to pay dividends.

♦

One way to plan for future requirements when installing distribution lines is to use ducts for installing feeders which will permit the placing of additional lines or changes at low expense.

♦

Welding Hose Prevents Explosions

■ Welding hose, designed to guard against accidental explosions caused when both gas lines are subjected to sparks and hot metals in welding operations has been announced by New York Belting & Packing Co., 1798 Broadway, New York.

The hose is constructed of an oxygen and acetylene resisting rubber tube covered with two of three plies of strong lightweight duck. Over these duck plies is braided a safety ply of asbestos yarn, which prevents hot sparks and metals from penetrating the hose.

Steel Buying Rate Fails To Continue Increase

Public Work Gives Most Tonnage; Auto Increase Is Small

■ UPWARD movement of steel buying in March seems to have spent itself and while the April rate promises to equal the previous month little evidence appears of a continued forward movement.

Miscellaneous industries are expanding slowly but their requirements are not sufficient to lend much support. Galvanized sheets are most active in flat-rolled products and tin plate is holding up well, production being close to 60 per cent. Sheets for stovemaking are being taken at a steady rate but buying for refrigerators is declining. Agricultural implement makers are operating at 70 to 75 per cent with indications of about two months activity before the seasonal lull.

Railroads are taking stock of the situation and considerable buying of rails is still to be done, even with tonnages held to the minimum.

While building as a whole is slow and aggregate tonnages are much below last year public work is bringing some important tonnages to fabricators. An award of sheet piling by the United States engineer at Los Angeles totals 2257 tons, the reclamation bureau has placed 5000 tons of shapes for Coulee dam, 1575 tons has been awarded for the Snake river bridge, 1500 tons for a bridge at Fort Worth, Tex., and 2500 tons for college buildings for the state of Pennsylvania. Pending items include 2000 tons for the United States building and 1000 tons for the Belgian building at the New York world's fair, 4000 tons for a bridge over the Mississippi river at Rock Island, Ill., and 2550 tons for a prison in Pennsylvania, part of which is reinforcing bars. Standard Oil Co. of Ohio projects a pipe line of 180 miles, which is estimated to require more than 10,000 tons of pipe.

Steelworks operation last week remained at 32 per cent, though indications are that this week may see some curtailment. Pittsburgh gained 1 point to 30 per cent and New England 10 points to 30 per cent. Chicago lost 1 point to 30 per cent, Youngstown 2 points to 31, Wheeling 2 points to 31, Cleveland 4 points to 23 and Cincinnati 27 points to 18 per cent. The latter has been staggering production alternate weeks from about 18 to 45 per cent. There was no change in the rate at Detroit at 18 per cent, St. Louis 42.4, Birmingham 66, Buffalo 28 and Eastern Pennsylvania 28.

Cargo ships for the maritime commission are slow in reaching awards. The 16 vessels now pending will require about 50,000 tons of hull steel and 6000 tons of other steel. Four requiring 12,000 tons have been tentatively awarded, pending completion of financing by the builder. Bids will be taken May 3 and 17. Former bids on part of this fleet were rejected as too far above the commission's estimates. Shipyards with contracts for tankers awarded earlier in the year are releasing tonnage as construction proceeds.

Gradual advance in automobile production brought the total for last week to 62,021 units, an increase of 1046 over the preceding week. General Motors made 23,620, compared with 22,430 the preceding week, Chrysler 13,775 compared with 14,075, Ford 16,135 compared with 15,885 and others 8491 compared with 8585.

Shipments of finished steel in March by United States Steel Corp. subsidiaries were 572,199 tons, an increase of 20.5 per cent over February but a decline of 59.4 per cent from a year ago. For first quarter shipments were 1,565,244 tons a decrease of 57.2 per cent from first quarter of 1937.

Declines of 25 to 50 cents in steelmaking grades of scrap were registered in practically all centers. In the East this is attributed to export demand drying up but in general it results from buying by melters on offers of prices below the market. Dealers have accepted these offers in order to move stock. The result of this general dropping of prices is a loss of 46 cents in the steelmaking scrap composite, carrying it to $12.17, the lowest since August, 1935. No signs of strength are apparent and further lowering is expected. The iron and steel composite dropped 3 cents, to $38.59, because of scrap weakness. The finished steel composite is unchanged at $61.70.

Great Britain is putting in effect its pig iron import duty of 33 1/3 per cent, which had been suspended for several months.

COMPOSITE MARKET AVERAGES

	April 16	April 9	April 2	One Month Ago Mar., 1938	Three Months Ago Jan., 1938	One Year Ago Apr., 1937	Five Years Ago Apr., 1933
Iron and Steel	$38.59	$38.62	$38.71	$38.80	$38.95	$40.39	$27.78
Finished Steel	61.70	61.70	61.70	61.70	61.70	61.45	44.94
Steelworks Scrap..	12.17	12.63	13.00	13.20	13.85	21.27	7.23

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	April 16, 1938	March 1938	Jan. 1938	April 1937
Steel bars, Pittsburgh	2.45c	2.45c	2.45c	2.45c
Steel bars, Chicago	2.50	2.50	2.50	2.50
Steel bars, Philadelphia	2.77	2.75	2.75	2.74
Iron bars, Terre Haute, Ind.	2.35	2.35	2.35	2.35
Shapes, Pittsburgh	2.25	2.25	2.25	2.25
Shapes, Philadelphia	2.465	2.465	2.465	2.455
Shapes, Chicago	2.30	2.30	2.30	2.30
Tank plates, Pittsburgh	2.25	2.25	2.25	2.25
Tank plates, Philadelphia	2.445	2.445	2.445	2.435
Tank plates, Chicago	2.30	2.30	2.30	2.30
Sheets, No. 10, hot rolled, Pitts.	2.40	2.40	2.40	2.40
Sheets, No. 24, hot ann., Pitts.	3.15	3.15	3.15	3.15
Sheets, No. 24, galv., Pitts.	3.80	3.80	3.80	3.80
Sheets, No. 10, hot rolled, Gary	2.50	2.50	2.50	2.50
Sheets, No. 24, hot anneal., Gary	3.25	3.25	3.25	3.25
Sheets, No. 24, galvan., Gary	3.90	3.90	3.90	3.90
Plain wire, Pittsburgh	2.90	2.90	2.90	2.90
Tin plate, per base box, Pitts.	$5.35	$5.35	$5.35	$5.25
Wire nails, Pittsburgh	2.75	2.75	2.75	2.75

Semifinished Material

Sheet bars, open-hearth, Youngs.	$37.00	$37.00	$37.00	$37.00
Sheet bars, open-hearth, Pitts.	37.00	37.00	37.00	37.00
Billets, open-hearth, Pittsburgh	37.00	37.00	37.00	37.00
Wire rods, No. 5 to 9/32-inch, Pitts.	47.00	47.00	47.00	47.00

Pig Iron

	April 16, 1938	March 1938	Jan. 1938	April 1937
Bessemer, del. Pittsburgh	$25.34	$25.26	$25.26	$25.26
Basic, Valley	23.50	23.50	23.50	23.50
Basic, eastern del. East. Pa.	25.34	25.34	25.34	25.26
No. 2 fdry., Pittsburgh	25.21	25.21	25.21	25.21
No. 2 fdry., Chicago	24.00	24.00	24.00	24.00
Southern No. 2, Birmingham	20.38	20.38	20.38	20.38
Southern No. 2, del. Cincinnati	23.89	23.89	23.89	23.69
No. 2X eastern, del. Phila.	26.215	26.215	26.215	26.135
Malleable, Valley	24.00	24.00	24.00	24.00
Malleable, Chicago	24.00	24.00	24.00	24.00
Lake Sup., charcoal, del. Chicago	30.34	30.24	30.24	30.04
Gray forge, del. Pittsburgh	24.17	24.17	24.17	24.17
Ferromanganese, del. Pittsburgh	107.77	107.49	107.49	99.79

Scrap

Heavy melting steel, Pittsburgh	$12.25	$13.65	$14.05	$22.75
Heavy melt. steel, No. 2, E. Pa.	11.25	12.75	13.75	19.06
Heavy melting steel, Chicago	11.25	12.20	13.25	20.75
Rails for rolling, Chicago	15.25	15.25	14.90	23.35
Railroad steel specialties, Chicago	13.75	14.25	15.75	23.75

Coke

Connellsville, furnace, ovens	$4.25	$4.25	$4.25	$4.50
Connellsville, foundry, ovens	5.25	5.25	5.25	5.05
Chicago, by-product foundry, del.	11.00	11.00	11.00	11.00

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Except when otherwise designated, prices are base, f.o.b. cars.

Sheet Steel

Prices Subject to Quantity Extras and deductions (Except Galvanized)

Hot Rolled No. 10, 24-48 in.

Pittsburgh	2.40c
Gary	2.50c
Chicago, delivered	2.53c
Detroit, del.	2.60c
New York, del.	2.76c
Philadelphia, del	2.72c
Birmingham	2.55c
St. Louis, del.	2.63c
Granite City, Ill.	2.60c
Pac. base pts. f.o.b. cars	2.97½c

Hot Rolled Annealed No. 24

Pittsburgh	3.15c
Gary	3.25c
Chicago, delivered	3.28c
Detroit, delivered	3.35c
New York, delivered	3.51c
Philadelphia, del	3.47c
Birmingham	3.30c
St. Louis, del.	3.38c
Granite City, Ill.	3.35c
Pac. base pts. f.o.b. cars	3.82½c

Galvanized No. 24

Pittsburgh	3.80c
Gary	3.90c
Chicago, delivered	3.93c
Philadelphia, del.	4.12c
New York, delivered	4.16c
Birmingham	3.95c
St. Louis, del.	4.03c
Granite City, Ill.	4.00c
Pac. base pts. f.o.b. cars	4.42½c

Tin Mill Black No. 28

Pittsburgh	3.30c
Gary	3.40c
St. Louis, delivered	3.53c
Granite City, Ill.	3.50c

Cold Rolled No. 10

Pittsburgh	3.00c
Gary	3.10c
Detroit, delivered	3.20c
Philadelphia, del.	3.32c
New York, del.	3.36c
St. Louis, del.	3.23c
Granite City, Ill.	3.20c
Pac. base pts. f.o.b. cars	3.62½c

Cold Rolled No. 20

Pittsburgh	3.45c
Gary	3.55c
Detroit, delivered	3.65c
Philadelphia, del.	3.77c
New York, del.	3.81c
St. Louis	3.68c
Granite City, Ill.	3.65c

Enameling Sheets

Pittsburgh, No. 10	2.90c
Pittsburgh, No. 20	3.50c
Gary, No. 10	3.00c
Gary, No. 20	3.60c
St. Louis, No. 10	3.13c
St. Louis, No. 20	3.73c

Tin and Terne Plate

Gary base, 10 cents higher

Tin plate, coke (base box) Pittsburgh	$5.35
Waste-waste, 2.80c; strip	2.50c
Long ternes, No. 24, unassorted, Pitts.	4.10c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No. 304
Bars	24.00	25.00
Plates	27.00	29.00
Sheets	34.00	36.00
Hot strip	21.50	23.50
Cold strip	28.00	30.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	18.50	19.00	22.50	27.50
Plates	21.50	22.00	25.50	30.50
Sheets	26.50	29.00	32.50	36.50
Hot strip	17.00	17.50	23.00	28.00
Cold stp.	22.00	22.50	28.50	36.50

Steel Plate

Pittsburgh	2.25c
New York, del	2.55c
Philadelphia, del.	2.44½c
Boston, delivered	2.68c
Buffalo, delivered	2.51c
Chicago or Gary	2.30c
Cleveland, del.	2.45½c
Birmingham	2.40c
Coatesville, base	2.35c
Sparrows Pt., base	2.35c
Pacific basing points, f.o.b. cars	2.82½c
St. Louis, delivered	2.54c

Structural Shapes

Pittsburgh	2.25c
Philadelphia, del.	2.46½c
New York, del.	2.52c
Boston, delivered	2.66c
Bethlehem	2.35c
Chicago	2.30c
Cleveland, del.	2.46c
Buffalo, delivered	2.37½c
Gulf Ports	2.66c
Birmingham	2.40c
Pacific coast basing pts., f.o.b. cars	2.82½c
St. Louis, del.	2.54c

Bars

Soft Steel

(Base, 3 to 25 tons)

Pittsburgh	2.45c
Chicago or Gary	2.50c
Duluth	2.60c
Birmingham	2.60c
Cleveland	2.50c
Buffalo	2.55c
Detroit, delivered	2.60c
Pacific coast basing pts., f.o.b. cars	3.02½c
Philadelphia, del	2.77c
Boston, delivered	2.89c
New York, del.	2.81c

Rail Steel

To Manufacturing Trade

Pittsburgh	2.30c
Chicago or Gary	2.35c
Cleveland	2.35c
Moline, Ill.	2.35c
Buffalo, delivered	2.37½c
Birmingham	2.45c

Iron

Terre Haute, Ind.	2.35c
Chicago	2.40c
Philadelphia	2.67c
Pittsburgh, refined	3.50-8.00c

Reinforcing

New billet, straight lengths, quoted by distributors

Pittsburgh	2.45c
Chicago, Gary, Buffalo, Cleve., Birm., Young.	2.50c
Gulf ports	2.85c
Pacific coast ports, f.o.b. car docks	2.95c
Philadelphia, del.	2.77c

Rail steel, straight lengths, quoted by distributors

Pittsburgh	2.30c
Chicago, Buffalo, Cleveland, Birm., Young.	2.35c
Gulf ports	2.70c

Wire Products

Prices apply to mixed carloads, base; less carloads subject to quantity extras.

Base Pitts.-Cleve. 100 lb. keg.

Standard wire nails	$2.75
Cement coated nails	$2.75

(Per pound)

Polished staples	3.45c
Galv. fence staples	3.70c
Barbed wire, galv.	3.40c
Annealed fence wire	3.15c
Galv. fence wire	3.55c
Woven wire fencing (base C. L. column)	.74
Single loop bale ties, (base C. L. column)	.63

To Manufacturing Trade

Plain wire, 6-9 ga.	2.90c
Galvanized wire	2.95c

Anderson, Ind. (merchant products only) and Chicago up $1; Duluth and Worcester up $2; Birmingham up $3.

Spring wire, Pitts. or Cleveland	3.50c

Do., Chicago up $1, Worc. $2.

Cold-Finished Carbon Bars, Shafting

Pittsburgh	2.90c
Chicago	2.95c
Gary, Ind.	2.95c
Detroit	2.95c
Cleveland	2.95c
Buffalo	3.00c

Subject to quantity deductions and extras. List dated Aug. 26, 1935; revised Oct. 1, 1936.

Alloy Steel Bars (Hot)

(Base, 3 to 25 tons)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem	3.00c

Alloy	Diff.	Alloy	Diff.
S.A.E.		S.A.E.	
2000	0.35	3100	0.70
2100	0.75	3200	1.35
2300	1.55	3300	3.80
2500	2.25	3400	3.20

4100 0.15 to 0.25 Mo.	0.55
4600 0.20 to 0.30 Mo. 1.50-2.00 Ni.	1.10
5100 0.80-1.10 Cr.	0.45
5100 Cr. spring	0.15
6100 bars	1.20
6100 spring	0.85
Cr. N., Van.	1.50
Carbon Van.	0.85
9200 spring flats	0.15
9200 spring rounds, squares	0.40

Piling

Pittsburgh	2.60c
Chicago, Buffalo	2.70c

Strip and Hoops

(Base, hot-rolled, 25-1 ton)
(Base, cold-rolled, 25-3 tons)

Hot strip to 23/4-in.	
Pittsburgh	2.40c
Chicago or Gary	2.50c
Birmingham base	2.55c
Detroit, del.	2.60c
Philadelphia, del.	2.72c
New York, del.	2.76c
Cooperage hoop,	
Pittsburgh	2.50c
Chicago	2.60c
Cold strip, 0.25 carbon and under, Pittsburgh, Cleveland	3.20c
Detroit, del.	3.41c
Worcester, Mass.	3.40c

Carbon	Cleve. Pitts.	Worcester, Mass.
0.26—0.50	3.20c	4.30c
0.51—0.75	4.45c	4.65c
0.76—1.00	6.30c	6.50c
Over 1.00	8.50c	8.70c

Rails, Track Material

(Gross Tons)

Standard rails, mill	$42.50
Relay rails, Pittsburgh 20—100 lbs.	32.50-35.50
Light rails, billet qual., Pittsburgh, Chicago	$43.00
Do., rerolling quality	42.00
Angle bars, billet, Gary, Pittsburgh, So. Chicago	2.80c
Do., axle steel	2.35c
Spikes, R. R. base	3.15c
Track bolts, base	4.35c
Tie plate, base	$46.00

Base, light rails 25 to 60 lbs.; 20 lbs. up $2; 16 lbs. up $4; 12 lbs. up $8; 8 lbs. up $10. Base railroad spikes 200 kegs or more; base plates 20 tons.

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade as per Dec. 1, 1932, lists:

Carriage and Machine

½ x 6 and smaller	65-5 off
Do. larger, to 1-in.	60-10 off
Do. 1⅛ and 1¼-in.	60-5 off
Tire bolts	50 off

Plow Bolts

All sizes	65-5 off

Stove Bolts

In packages with nuts attached 70 off; in packages with nuts separate 70-10 off; in bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-inch.

Step bolts	50-10-5 off
Elevator bolts	50-10-5 off

Nuts

S. A. E. semifinished hex.: ½ to 7/8-inch	60-10 off
Do., 9/16 to 1-inch	60-5 off
Do., over 1-inch	60 off

Hexagon Cap Screws

Milled	50-10 off
Upset, 1-in., smaller	60 off

Square Head Set Screws

Upset, 1-in., smaller	75 off
Headless set screws	75 off

Rivets, Wrought Washers

Structural, Pittsburgh, Cleveland	3.60c
Structural, Chicago	3.70c
7/8-inch and smaller, Pitts., Chi., Cleve.	65-5 off

Wrought washers, Pitts., Chi., Phila. to jobbers and large nut, bolt mfrs. l.c.l. $5.40; c.l. $5.75 off

Cut Nails

Cut nails, C. L. Pitts. (10% disc. on all extras)	$3.60
Do., less carloads, 5 kegs or more, no discount on any extras	$3.90
Do., under 5 kegs no disc. on any extras	$4.05

Welded Iron, Steel Pipe

Base discounts on steel pipe, Pitts, Lorain, O., to consumers in carloads. Gary, Ind., 2 points less. Chicago, del. 2½ less. Wrought pipe, Pittsburgh.

Butt Weld

Steel

In.	Blk.	Galv.
⅛	59½	49
¼	62½	53
1—3	64½	55½

Iron

¼	26	8
1—1¼	30	14
1½	34	16½
2	33½	16

Lap Weld

Steel

2	57	47½
2½—3	60	50½
3½—6	62	52½
7 and 8	61	50½
9 and 10	60½	50

Iron

2	26½	10
2½—3½	27½	12½
4	29½	16
4½—8	28½	15
9—12	24½	10

Line Pipe

Steel

1 to 3, butt weld	63½
2, lap weld	56
2½ to 3, lap weld	59
3½ to 6, lap weld	61
7 and 8, lap weld	60
10-inch, lap weld	59½
12-inch, lap weld	58½

Butt Weld

Iron

	Blk.	Galv.
¾	25	7
1 and 1¼	29	13
1½	33	15½
2	32½	15

Lap Weld

1½	23½	7
2	25½	9
2½ to 3½	26½	11½
4	28½	15
4½ to 8	27½	14
9 to 12	23½	9

Boiler Tubes

Carloads minimum wall seamless steel boiler tubes, cut lengths 4 to 24 feet, f.o.b. Pittsburgh, base price per 100 feet subject to usual extras.

Lap Weld

Sizes	Steel	Charcoal Iron
1½" OD x 13 Ga.	$10.45	$23.71
1¾" OD x 13 Ga.	11.89	22.93
2" OD x 13 Ga.	13.31	19.35
2" OD x 11 Ga.	15.49	23.36
2¼" OD x 13 Ga.	14.82	21.68
2¼" OD x 11 Ga.	17.38	26.02
2½" OD x 12 Ga.	17.82	26.57
2¾" OD x 12 Ga.	18.86	29.00
3" OD x 12 Ga.	19.73	31.36
3½" OD x 11 Ga.	24.89	39.81
4" OD x 10 Ga.	30.81	49.90
5" OD x 9 Ga.	47.57	73.93
6" OD x 7 Ga.	73.25	....

Seamless

	Hot Rolled	Cold Drawn
1" OD x 13 Ga.	$ 8.41	$ 9.46
1¼" OD x 13 Ga.	9.96	11.21
1½" OD x 13 Ga.	11.00	12.38
1¾" OD x 13 Ga.	12.51	14.09
2"OD x 13 Ga.	14.02	15.78
2¼" OD x 13 Ga.	15.63	17.60
2¼" OD x 12 Ga.	17.21	19.37
2½" OD x 12 Ga.	18.81	21.22
2¾" OD x 12 Ga.	19.98	22.49
3" OD x 12 Ga.	20.97	23.60
4½" OD x 10 Ga.	40.15	45.19
3½" OD x 11 Ga.	26.47	29.79
4" OD x 10 Ga.	32.83	36.94
5" OD x 9 Ga.	50.38	56.71
6" OD x 7 Ga.	77.35	87.07

Cast Iron Water Pipe

Class B Pipe—Per Net Ton

6-in. & over, Birm.	$46.00-47.00
4-in., Birmingham	49.00-50.00
4-in., Chicago	57.80-58.80
6 to 24-in., Chicago	54.80-55.80
6-in. & over, east fdy.	50.00
Do., 4-in.	53.00

Class A Pipe $3 over Class B
Stnd. fitgs., Birm., base $100.00

Semifinished Steel

Billets and Blooms

4 x 4-inch base; gross ton

Pitts., Chi., Cleve., Buffalo, Young., Birm.	$37.00
Philadelphia	42.83
Duluth	39.00

Forging Billets

6 x 6 to 9 x 9-in., base

Pitts., Chicago, Buffalo	43.00
Forging, Duluth	45.00

Sheet Bars

Pitts., Cleve., Young Sparrows Point	37.00

Slabs

Pitts., Chicago, Cleveland, Youngstown	37.00

Wire Rods

Pitts., Cleve., No. 5 to 5/16-inch incl.	47.00
Do., over 5/16 to 41/64-inch incl.	52.00

Chicago up $1; Worcester up $2.

Skelp

Pitts., Chi., Young., Buff., Coatesville, Sparrows Pt.	2.10c

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.	$4.00- 4.50
Connellsville, fdry.	5.00- 5.50
Connell. prem. fdry	5.75- 6.25
New River fdry.	6.50- 6.75
Wise county fdry.	5.75- 6.00
Wise county fur.	4.75- 5.00

By-Product Foundry

Newark, N. J., del.	10.88-11.35
Chi., ov., outside del.	10.25
Chicago, del.	11.00
Milwaukee, ovens	11.00
New England, del.	12.50
St. Louis, del.	11.00-11.50
Birmingham, ovens	7.50
Indianapolis, del.	10.50
Cincinnati, del.	10.50
Cleveland, del.	11.05
Buffalo, del.	10.50
Detroit, del.	11.10
Philadelphia, del.	10.65

Coke By-Products

Spot, gal. Producers' Plants

Pure and 90% benzol	16.00c
Toluol	30.00c
Solvent naphtha	30.00c
Industrial xylol	30.00c

Per lb. f.o.b. Frankford and St. Louis

Phenol (200 lb. drums)	16.25c
do. (450 lbs.)	15.25c

Eastern Plants, per lb.

Naphthalene flakes and balls, in bbls. to jobbers	6.75c
Per ton, bulk, f.o.b. oven or port	
Sulphate of ammonia	$29.50

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25 sil.; 50c diff. below 1.75 sil. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$25.00	$25.50	$24.50	$26.00
Birdsboro, Pa.	25.00	25.50	24.50	26.00
Birmingham, Ala.‡	20.38	.....	19.38	25.00
Buffalo	24.00	24.50	23.00	25.00
Chicago	24.00	24.00	23.50	24.50
Cleveland	24.00	24.00	23.50	24.50
Detroit	24.00	24.00	23.50	24.50
Duluth	24.50	24.50	.....	25.00
Erie, Pa.	24.00	24.50	23.50	25.00
Everett, Mass.	25.75	26.25	25.25	26.75
Granite City, Ill.	24.00	24.00	23.50	24.50
Hamilton, O.	24.00	24.00	23.50	.....
Neville Island, Pa.	24.00	24.00	23.50	24.50
Provo, Utah	22.00	.....	.....	.....
Sharpsville, Pa.	24.00	24.00	23.50	24.50
Sparrow's Point, Md.	25.00	.....	24.50	.....
Swedeland, Pa.	25.00	25.50	24.50	26.00
Toledo, O.	24.00	24.00	23.50	24.50
Youngstown, O.	24.00	24.00	23.50	24.50

‡Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

Delivered from Basing Points:				
Akron, O., from Cleveland	25.39	25.39	24.89	25.89
Baltimore from Birmingham	25.78	.....	24.66	.....
Boston from Birmingham	25.87	.....	.....	.....
Boston from Everett, Mass.	26.25	26.75	25.75	27.25
Boston from Buffalo	26.25	26.75	25.75	27.25
Brooklyn, N. Y., from Bethlehem	27.50	28.00	.....	.....
Canton, O., from Cleveland	25.39	25.39	24.89	25.89
Chicago from Birmingham	†24.22	.....	.....	.....
Cincinnati from Hamilton, O.	24.44	25.11	24.78	.....
Cincinnati from Birmingham	24.06	.....	23.06	.....
Cleveland from Birmingham	24.32	.....	23.82	.....
Mansfield, O., from Toledo, O.	25.94	25.94	25.44	25.44
Milwaukee from Chicago	25.10	25.10	24.60	25.10
Muskegon, Mich., from Chicago, Toledo or Detroit	27.10	27.10	26.60	27.60
Newark, N. J., from Birmingham	26.15	...	.....	.....
Newark, N. J., from Bethlehem	26.53	27.03	.....	.....
Philadelphia from Birmingham	25.46	.....	24.96	.....
Philadelphia from Swedeland, Pa.	25.84	26.34	25.34	.....
Pittsburgh district from Neville Island	{ Neville base, plus 69c, 84c, and $1.24 freight.			
Saginaw, Mich., from Detroit	26.45	26.45	25.95	25.95
St. Louis, northern	24.55	24.55	24.05	.....
St. Louis from Birmingham	†24.12	.....	23.82	.....
St. Paul from Duluth	26.08	26.08	.....	26.58

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Standish, N. Y., $28.50, Phil. base, standard and copper bearing, $29.63.

Gray Forge		Charcoal	
Valley furnace	$23.50	Lake Superior fur.	$27.00
Pitts. dist. fur.	23.50	do., del. Chicago	30.34
		Lyles, Tenn.	26.50

Silvery†

Jackson county, O., base: 6-6.50 per cent $28.50; 6.51-7—$29.00; 7-7.50—$29.50; 7.51-8—$30.00; 8-8.50—$30.50; 8.51-9—$31.00; 9-9.50—$31.50; Buffalo $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base: Prices are the same as for silveries, plus $1 a ton.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon, 2 to 3%, $1 per ton add. Each unit over 3%, add $1 per ton.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$64.60

First Quality

Pa., Ill., Md., Mo., Ky.	51.30
Alabama, Georgia	51.30
New Jersey	56.00

Second Quality

Pa., Ill., Ky., Md., Mo.	46.55
Georgia, Alabama	41.80
New Jersey	51.00

Ohio

First quality	43.70
Intermediate	39.90
Second quality	35.15

Malleable Bung Brick

All bases	$59.85

Silica Brick

Pennsylvania	$51.30
Joliet, E. Chicago	59.85
Birmingham, Ala.	51.30

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$30.00
Wire cut	$28.00

Magnesite

Imported dead - burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags) $45.00

Domestic dead - burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags) 43.00

Base Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$49.00
Chem. bonded chrome	49.00
Magnesite brick	69.00
Chem. bonded magnesite	59.00

Fluorspar, 85-5

Washed gravel, duty paid, tide, net ton	$23.50-24.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail	$20.00
Do., for barge	$22.00
No. 2 lump	22.00-23.00

Ferroalloys

Dollars, except Ferrochrome

Ferromanganese, 78-82%, tidewater, duty pd.	$102.50
Do., Baltimore, base	102.50
Do., del. Pittsburgh	107.77
Spiegeleisen, 19-21% dom. Palmerton, Pa., spot	33.00
Do., New Orleans	33.00
Do., 26-28%, Palmerton	39.00
Ferrosilicon, 50% freight allowed, c.l.	69.50
Do., ton lot	80.50
Do., 75 per cent	126.00
Spot, $5 a ton higher.	
Silicoman., 2½ carbon	106.50
2% carbon 111.50; 1%,	121.50
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb. del.	10.50
Ferrotungsten, stand., lb. con. del. cars	1.90-2.00
Ferrovanadium, 35 to 40% lb., cont.	2.70-2.90
Ferrotitanium, c. l., prod-plant, frt. all., net ton	142.50
Contract, ton lots	145.00
Spot, ton lots	150.00
Ferrophosphorus, per ton, c.l., 17-18% Rockdale, Tenn., basis, 18%, $3 unitage	58.50
Ferrophosphorus, electrolytic, per ton c. l., 23-26% f.o.b. Monsanto, Tenn., 24% $3 unitage	75.00
Ferromolybdenum, stand. 55-65%, lb. f.o.b. mill	0.95
Molybdate, lb. cont. f.o.b. mill	0.80
Technical molybdenum trioxide, 53 to 60% molybdenum, f.o.b. mill	0.80

†Carloads. Quan. diff. apply.

Nonferrous

METAL PRICES OF THE WEEK

Spot unless otherwise specified. Cents per pound

	Copper: Electro, del. Conn.	Copper: Lake, del. Midwest	Copper: Casting, refinery	Straits Tin, New York: Spot	Straits Tin, New York: Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony American Spot, N. Y.	Nickel Cathodes
April 9	10.00	10.12½	9.52½	39.00	39.15	4.50	4.35	4.00	20.00	13.75	35.00
April 11	10.00	10.12½	9.52½	39.10	39.25	4.50	4.35	4.00	20.00	13.75	35.00
April 12	10.00	10.12½	9.52½	38.50	38.65	4.50	4.35	4.00	20.00	13.75	35.00
April 13	10.00	10.12½	9.52½	38.70	38.85	4.50	4.35	4.00	20.00	13.75	35.00
April 14	10.00	10.12½	9.52½	38.87½	39.00	4.50	4.35	4.00	20.00	13.75	35.00
April 15	10.00	10.12½	9.52½	39.25	39.55	4.50	4.35	4.00	20.00	13.75	35.00

MILL PRODUCTS

F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 10.00c Conn. copper

Sheets

Yellow brass (high)	16.37½
Copper, hot rolled	18.12½
Lead, cut to jobbers	7.75
*Zinc, 100-lb. base	9.75

Tubes

High, yellow brass	19.12½
Seamless copper	18.62½

Rods

High yellow brass	12.37½
Copper, hot rolled	14.62½

Anodes

Copper, untrimmed	15.37½

Wire

Yellow brass (high)	16.62½

OLD METALS

Nom. Del. buying prices

No. 1 Composition Red Brass

*New York	5.65-5.90
Cleveland	6.25-6.50
Chicago	5.25-5.50
St. Louis	5.00-5.25

Heavy Copper and Wire

*New York, No. 1	6.62½-6.87½
Cleveland, No. 1	7.00-7.25
*Chicago, No. 1	7.25-7.50
St. Louis	6.50-6.75

Composition Brass Borings

*New York	5.65-5.90

Light Copper

*New York	4.62½-4.87½
Cleveland	5.25-5.50
*Chicago	5.25-5.50
St. Louis	4.75-5.00

Light Brass

Cleveland	3.25-3.50
*Chicago	3.37½-3.62½
St. Louis	3.00-3.25

Lead

New York	3.50-3.75
Cleveland	3.25-3.50
Chicago	3.00-3.25
St. Louis	2.75-3.00

Zinc

New York	1.75-1.87½
Cleveland	1.75-2.00
St. Louis	1.50-1.75

Aluminum

Borings, Cleveland	4.75-5.00
Mixed cast, Cleve.	6.75-7.00
Clips, soft, Cleve.	11.25-11.50
Mixed cast, St. L.	7.00-7.25

SECONDARY METALS

Brass ingot, 85-5-5-5, lcl	10.25
Stand. No. 12 alum.	15.25-15.75

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials

	Soft Bars	Bands	Hoops	Plates ¼-In. & Over	Structural Shapes	Floor Plates	Sheets Hot Rolled No. 10	Sheets Hot Roll Ann. No. 24	Sheets Galv. No. 24
Boston	4.26	4.46	5.46	4.11	4.10	5.76	4.21	4.96	5.00
New York (Metropolitan)	4.16	4.36	4.36	4.02	3.99	5.62	4.11	4.75	5.00
Philadelphia	4.03	4.13	4.63	3.92	3.92	5.25	4.03	4.65	4.90
Baltimore	4.00	4.20	4.45	3.90	3.90	5.50	3.95	4.50	4.70
Norfolk, Va.	4.20	4.40	4.65	4.10	4.10	5.70	4.15	4.75	5.40
Buffalo	3.90	4.25	4.25	3.95	3.80	5.55	4.00	4.83	5.38
Pittsburgh	3.80	4.00	4.00	3.70	3.70	5.30	3.75	4.50	5.15
Cleveland	3.75	4.19	4.19	3.89	3.89	5.49	3.94	4.69	5.34
Detroit	3.935	4.185	4.185	3.95	3.95	5.55	3.935	4.685	5.40
Cincinnati	4.07	4.29	4.29	3.99	3.99	5.59	4.04	4.79	5.44
Chicago	3.85	4.10	4.10	3.75	3.75	5.35	3.85	4.60	5.25
Minneapolis	4.10	4.35	4.35	4.00	4.00	5.60	4.10	4.75	5.00
Milwaukee	3.96	4.21	4.21	3.86	3.86	5.46	3.96	4.71	5.36
St. Louis	4.12	4.37	4.37	4.02	4.02	5.62	4.12	4.87	5.52
Kansas City	4.34	4.59	4.59	4.24	4.24	5.84	4.10	4.85	5.50
Memphis	4.35	4.55	4.55	4.25	4.25	5.91	4.30	5.05	5.70
Chattanooga	4.25	4.45	4.45	4.15	4.15	5.98	4.20	4.10	4.70
Tulsa, Okla.	4.89	5.14	5.14	4.79	4.79	6.39	4.89	5.64	6.29
Birmingham, Ala.	3.85	4.05	4.05	3.75	3.75	5.96	3.80	4.55	5.20
New Orleans	4.10	4.65	4.65	4.00	4.00	5.95	4.25	4.75	5.15
Houston, Tex.	3.75	6.15	6.55	4.25	4.25	6.15	4.50	5.25	5.65
Seattle	4.45	4.95	6.30	4.25	4.25	6.00	4.50	5.35	5.90
Portland, Oreg.	4.45	4.95	6.30	4.25	4.25	6.00	4.50	5.15	5.90
Los Angeles	4.30	4.80	6.55	4.30	4.30	6.20	4.50	5.00	5.25
San Francisco	4.20	4.80	6.50	4.05	4.05	5.55	4.30	5.15	5.55

	Cold Rolled Strip	Cold Finished Bars	SAE Hot-rolled Bars (Unannealed) 1035-1050	2300 Series	3100 Series	4100 Series	6100 Series	SAE Cold Drawn Bars 2300	SAE Cold Drawn Bars 3100
Boston	3.86	4.71	4.56	8.00	6.55	6.30	8.40	9.02	7.57
New York	3.96	4.61	4.36	7.84	6.39	6.14	9.54	9.04	7.59
Philadelphia	3.88	4.56	4.28	7.81	6.36	6.11	9.01	....	....
Baltimore	....	4.50	4.15	....	....	....	....	....	....
Norfolk, Va.	....	4.60	....	....	....	....	....	....	....
Buffalo	3.82	4.35	4.10	7.60	6.15	5.90	8.00	8.60	8.15
Pittsburgh	....	4.15	3.95	7.70	6.25	8.50	9.10	8.70	7.25
Cleveland	3.60	4.30	3.95	7.78	6.33	6.33	8.18	8.60	7.15
Detroit	3.78	4.30	4.085	7.89	6.44	6.19	7.74	8.88	7.43
Cincinnati	....	4.52	4.07	7.91	6.46	6.21	9.31	8.92	7.47
Chicago	3.91	4.30	4.05	7.60	6.15	5.90	8.00	8.60	7.15
Minneapolis	....	4.83	4.25	7.95	6.50	9.03	9.63	9.23	7.78
Milwaukee	.	4.41	4.16	7.81	6.36	6.11	8.21	8.81	7.36
St. Louis	4.01	4.57	4.32	7.97	6.52	6.27	8.37	8.97	7.52
Kansas City	4.37	4.79	....	....	....	....	....	....	....
Memphis	....	4.86	....	....	....	....	....	....	....
Chattanooga	....	4.90	....	....	....	....	....	....	....
Tulsa, Okla.	....	5.34	....	....	....	....	....	....	....
New Orleans	5.00	5.10	....	....	....	....	....	....	....
Seattle	....	5.85	6.05	....	8.00	8.00	8.65	....	....
Portland, Oreg.	....	5.85	5.85	9.00	8.00	7.85	8.70	....	....
Los Angeles	5.96	6.85	4.65	9.40	8.55	8.40	9.05	10.40	9.55
San Francisco	9.30	6.80	5.20	9.65	8.80	8.65	9.30	10.65	9.80

CURRENT IRON AND STEEL PRICES OF EUROPE

Dollars at Rates of Exchange, April 14

Export Prices f. o. b. Port of Dispatch—

By Cable or Radio

	British gross tons U. K. ports £ s d	Continental Channel or North Sea ports, metric tons: Quoted in dollars at current value	**Quoted in gold pounds sterling £ s d
Foundry, 2.50-3.00 Si.	$27.45 5 10 0	$18.49	2 6 0
Basic bessemer	....	....	....
Hematite, Phos. .03-.05	32.44 6 10 0*	17.89	2 4 6
Billets	$39.30 7 17 6	$43.22	5 7 6
Wire rods, No. 5 gage	56.26 11 5 6	39.17	4 17 6
Standard rails	$50.52 10 2 6	$46.23	5 15 0
Merchant bars	2.62c 11 15 0	1.90c	5 5 0
Structural shapes	2.37c 10 12 6	1.77c	4 17 6
Plates, †¼ in. or 5 mm.	2.58c 11 11 3	2.23c	6 2 6
Sheets, black, 24 gage or 0.5 mm.	3.12c 14 0 0	2.82c	7 15 0°
Sheets, gal., 24 ga., corr.	3.72c 16 15 0	3.45c	9 10 0
Bands and strips	2.95c 13 5 0	1.73c	4 15 0
Plain wire, base	4.35c 19 10 0	2.23c to 2.64c	6 2 6 to 7 5 0
Galvanized wire, base	5.18c 23 5 0	2.85c to 2.95c	7 17 6 to 8 2 6
Wire nails, base	4.13c 18 10 0	2.54c to 2.72c	7 0 0 to 7 10 0
Tin plate, box 108 lbs.	$5.61 1 2 6	....	....

British ferromanganese $102.50 delivered Atlantic seaboard, duty-paid

Domestic Prices at Works or Furnace—

Last Reported

	£ s d	French Francs		Belgian Francs		Reich Marks	
Fdy. pig iron, Si. 2.5	$27.30 5 9 0(a)	$17.81	563.50	$20.22	600	$25.34	63
Basic bess pig iron	24.95 5 0 0(a)	....	....	....	....	27.96	(b)69.50
Furnace coke	8.11 1 12 6	5.97	189	7.25	215	7.64	19
Billets	39.30 7 17 6	26.54	840	32.35	960	38.82	96.50
Standard rails	2.26c 10 2 6	1.61c	1,150	2.06c	1,375	2.38c	132
Merchant bars	2.55c 11 9 0	1.51c	1,080	1.65c	1,100	1.98c	110
Structural shapes	2.46c 11 0 6	1.48c	1,055	1.65c	1,100	1.93c	107
Plates, †¼-in. or 5 mm.	2.61c 11 14 3	1.89c	1,350	2.05c	1,375	2.29c	127
Sheets, black	3.51c 15 15 0§	2.19c	1,565‡	2.36c	1,575‡	2.59c	144‡
Sheets, galv., corr., 24 ga. or 0.5 mm	4.13c 18 10 0	3.15c	2,250	4.50c	3,000	6.66c	370
Plain wire	4.35c 19 10 0	2.32c	1,660	2.48c	1,650	3.11c	173
Bands and strips	2.72c 12 4 0	1.69c	1,210	1.95c	1,300	2.29c	127

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continent usually for basic-bessemer steel. (a) del. Middlesbrough. 5s rebate to approved customers. (b) hematite. °Close annealed.

**Gold pound sterling carries a premium of 64.85 per cent over paper sterling.

IRON AND STEEL SCRAP PRICES

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated; † indicates brokers prices

HEAVY MELTING STEEL

Birmingham, No. 1	10.00
Birmingham, No. 2	9.00
Bos. dock No. 1 exp.	12.00
N. Eng. del. No. 1	12.50
Buffalo, No. 1	11.50-12.00
Buffalo, No. 2	9.50-10.00
Chicago, No. 1	11.00-11.50
Cincinnati	8.50- 9.00
Cleveland, No. 1	11.00-11.50
Cleveland, No. 2	10.00-10.50
Detroit, No. 1	6.50- 7.00
Eastern Pa., No. 1	13.50
Eastern Pa., No. 2	11.00-11.50
Federal, Ill.	9.50-10.00
Granite City, R. R.	10.25-10.75
Granite City, No. 2	9.50-10.00
Los Angeles, No. 1	13.50-14.00
Los Angeles, No. 2	12.00-12.50
New York, No. 1	†10.00
N. Y. dock No. 1 exp.	11.50
Pitts., No. 1 (R. R.)	14.25-14.75
Pitts., No. 1 (dlr.)	12.00-12.50
Pittsburgh, No. 2	11.00-11.50
St. Louis, R. R.	10.25-10.75
St. Louis, No. 2	9.50-10.00
San Francisco, No. 1	10.00
Seattle, No. 1	8.00
Toronto, dlrs. No. 1	10.00
Valleys, No. 1	12.00-12.50

COMPRESSED SHEETS

Buffalo	9.50-10.00
Chicago, factory	10.00-10.50
Chicago, dealer	9.50-10.00
Cleveland	10.50-11.00
Detroit	8.25- 8.75
E. Pa., new mat.	13.50
E. Pa., old mat.	9.00- 9.50
Los Angeles	12.50-13.00
Pittsburgh	12.00-12.50
St. Louis	6.00- 6.50
Valleys	11.00-11.50

BUNDLED SHEETS

Buffalo, new	10.50-11.00
Buffalo, old	8.50- 9.00
Cincinnati, del.	7.75- 8.25
Cleveland	7.50- 8.00
Los Angeles	11.00-11.50
Pittsburgh	11.00-11.50
St. Louis	5.00- 5.50
Toronto, dealers	7.00

SHEET CLIPPINGS, LOOSE

Chicago	7.00- 7.50
Cincinnati	4.25- 4.75
Detroit	5.25- 5.75
†Los Angeles	3.75- 4.00
St. Louis	4.00- 4.50

STEEL RAILS, SHORT

Birmingham	15.00
Buffalo	16.50-17.00
Chicago (3 ft.)	14.50-15.00
Chicago (2 ft.)	15.00-15.50
Cincinnati, del.	15.50-16.00
Detroit	13.50-14.00
Los Angeles	15.00-17.50
Pitts., 3 ft. and less	17.25-17.75
St. Louis, 2 ft. & less	14.00-14.50

STEEL RAILS, SCRAP

Boston district	†10.00
Buffalo	13.50-14.00
Chicago	11.00-11.50
Cleveland	16.00-16.50
Pittsburgh	15.25-15.75
St. Louis	11.50-12.00
Seattle	10.00

STOVE PLATE

Birmingham	8.00- 8.50
Boston district	†8.00
Buffalo	11.00-11.50
Chicago, net	7.50- 8.00
Cincinnati, dealers	5.25- 5.50
Detroit, net	7.50- 8.00
Eastern Pa.	12.00-12.50
New York, fdry.	†7.50
St. Louis	7.00- 7.50
Toronto, deal'rs, net	9.00

SPRINGS

Buffalo	15.00-15.50
Chicago, coil	15.00-15.50
Chicago, leaf	14.00-14.50
Eastern Pa.	16.50-17.00
Pittsburgh	17.00-17.75
St. Louis	13.00-13.50

ANGLE BARS—STEEL

Chicago	13.50-14.00
St. Louis	12.00-12.50

RAILROAD SPECIALTIES

Chicago	13.50-14.00

LOW PHOSPHORUS

Buffalo, crops	16.00-17.00
Cleveland, crops	19.50-20.50
Eastern Pa., crops	17.50-18.00
Pittsburgh, crops	16.50-17.50

FROGS, SWITCHES

Chicago	11.00-11.50
St. Louis, cut	11.50-12.00

SHOVELING STEEL

Federal, Ill.	9.50-10.00
Granite City, Ill.	9.50-10.00
Los Angeles	15.00-16.50
Toronto, dealers	8.00

RAILROAD WROUGHT

Birmingham	11.00-11.50
Boston district	†9.00- 9.50
Chicago, No. 1 net	8.50- 9.00
Cincinnati, No. 2	8.25- 8.75
Eastern Pa., No. 1	15.00-15.50
St. Louis, No. 1	8.00- 8.50
St. Louis, No. 2	9.75-10.25
Toronto, No. 1 dlr.	16.00

SPECIFICATION PIPE

Eastern Pa.	14.00-14.50
New York	†9.00- 9.50

BUSHELING

Buffalo, No. 1	9.50-10.00
Chicago, No. 1	10.00-10.50
Cincin., No. 1, deal.	6.75- 7.25
Cincinnati, No. 2	2.75- 3.25
Cleveland, No. 2	6.50- 7.00
Detroit, No. 1, new	6.50- 7.00
Valleys, new, No. 1	11.00-11.50
Toronto, dealers	7.00

MACHINE TURNINGS (Long)

Birmingham	6.00- 7.00
Buffalo	5.50- 6.00
Chicago	4.50- 5.00
Cincinnati, dealers	2.50- 3.00
Cleveland	6.50- 7.00
Detroit	3.50- 4.00
Eastern Pa.	6.50
Los Angeles	4.00- 4.25
New York	†3.50
Pittsburgh	7.00- 7.50
St. Louis	3.50- 4.00
Toronto, dealers	7.00
Valleys	9.50-10.00

BORINGS AND TURNINGS

For Blast Furnace Use

Boston district	1.25
Buffalo	5.50- 6.00
Cincinnati, dealers	2.00- 2.50
Cleveland	6.50- 7.00
Eastern Pa.	6.00- 6.50
Detroit	4.00- 4.50
New York	†2.50- 3.00
Pittsburgh	6.00- 6.50
Toronto, dealers	7.50

CAST IRON BORINGS

Birmingham	6.00- 7.00
Boston dist. chem.	†6.00
Bos. dist. for mills	†6.00
Buffalo	5.50- 6.00
Chicago	4.50- 5.00
Cincinnati, dealers	2.00- 2.50
Cleveland	6.50- 7.00
Detroit	4.00- 4.50
E. Pa., chemical	10.00-11.00
New York	†3.50-4.00
St. Louis	3.25- 3.75
Toronto, dealers	7.50

PIPE AND FLUES

Cincinnati, dealers	5.25- 5.75
Chicago, net	7.50- 8.00

RAILROAD GRATE BARS

Buffalo	8.50- 9.00
Chicago, net	7.50- 8.00
Cincinnati	5.75- 6.25
Eastern Pa.	12.00-12.50
New York	†8.00
St. Louis	7.50- 8.00

FORGE FLASHINGS

Boston district	†6.25
Buffalo	9.50-10.00
Cleveland	10.50-11.00
Detroit	5.75- 6.25
Los Angeles	9.00
Pittsburgh	11.00-11.50

FORGE SCRAP

Boston district	†6.25
Chicago, heavy	14.50-15.00

ARCH BARS, TRANSOMS

St. Louis	13.00-13.50

AXLE TURNINGS

Boston district	†7.50
Buffalo	10.00-10.50
Chicago, elec. fur.	10.50-11.00
Eastern Pa.	11.00-11.50
St. Louis	8.50- 9.00
Toronto	8.00

STEEL CAR AXLES

Birmingham	16.00-17.00
Buffalo	16.00-16.50
Boston district	†14.00
Chicago, net	16.00-16.50
Eastern Pa.	21.50-22.50
St. Louis	17.00-17.50

SHAFTING

Boston district	†13.75
New York	†14.50-15.00
Eastern Pa.	18.50
St. Louis	13.00-13.50

CAR WHEELS

Birmingham	14.00-15.00
Boston dist., iron	†10.00
Buffalo, steel	15.00-15.50
Chicago, iron	13.00-13.50
Chicago, rolled steel	14.00-14.50
Cincinnati, iron	13.00-13.50
Eastern Pa., iron	14.50-15.00
Eastern Pa., steel	16.50-17.00
Pittsburgh, iron	14.50-15.00
Pittsburgh, steel	17.00-17.75
St. Louis, iron	11.50-12.00
St. Louis, steel	13.00-13.50

NO. 1 CAST SCRAP

Birmingham	14.00-14.50
Boston, No. 1 mach.	†10.00
N. Eng. del. No. 2	12.00
N. Eng. del. textile	14.00
Buffalo, cupola	12.50-13.00
Buffalo, mach.	13.50-14.00
Chicago, agri. net	10.00-10.50
Chicago, auto	11.00-11.50
Chicago, railr'd net	10.00-10.50
Chicago, mach. net	11.00-11.50
Cincin., mach. cup.	10.25-10.75
Cleveland, mach.	17.00-17.50
Eastern Pa., cupola	15.00-15.50
E. Pa., mixed yard	12.50-13.00
Los Angeles, net	13.50-14.00
Pittsburgh, cupola	14.50-15.00
San Francisco, del.	13.50-14.00
Seattle	10.00-12.00
St. Louis, No. 1	11.25-11.75
St. L., No. 1, mach.	13.00-13.50
Toronto, No. 1, mach., net	12.50

HEAVY CAST

Boston dist. break.	†8.50- 8.75
New England, del.	12.00
Buffalo, break.	10.50-11.00
Cleveland, break.	14.00-15.00
Detroit, break.	10.00-10.50
Detroit, auto net	11.00-11.50
Eastern Pa.	13.50-14.00
Los Ang., auto, net	13.00-13.50
New York, break.	†10.00-10.50
Pittsburgh, break.	12.00-12.50

MALLEABLE

Birmingham, R. R.	12.50-13.50
New England, del.	16.00
Buffalo	13.00-13.50
Chicago, R. R.	12.50-13.00
Cincin., agri. del.	9.75-10.25
Cleveland, rail	15.50-16.00
Detroit, auto	10.00-10.50
Eastern Pa., R. R.	15.50-16.00
Los Angeles	17.50-18.00
Pittsburgh, rail	14.25-14.75
St. Louis, R. R.	11.00-11.50

RAILS FOR ROLLING

5 feet and over

Birmingham	16.00-17.00
Boston	†11.00
Chicago	15.00-15.50
Eastern Pa.	17.50-18.00
New York	†15.00-15.50
St. Louis	13.50-14.00

LOCOMOTIVE TIRES

Chicago (cut)	14.00-14.50
St. Louis, No. 1	12.00-12.50

LOW PHOS. PUNCHINGS

Buffalo	15.50-16.00
Chicago	13.50-14.00
Eastern Pa.	17.50-18.00
Pitts. (light & hvy.)	16.50-17.50
Seattle	15.00

Iron Ore

Lake Superior Ore

Gross ton, 51½ % Lower Lake Ports

Old range bessemer	$5.25
Mesabi nonbess.	4.95
High phosphorus	4.85
Mesabi bessemer	5.10
Old range nonbess.	5.10

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56.63% con.	9.00-10.00
Cop.-free low phos. 58-60%	nominal

Foreign Ore

Cents per unit, f.a.s. Atlantic

Foreign manganiferous ore, 45.55% iron, 6-10% man. nom.	12.00-13.00
No. Afr. low phos.	nominal
Swedish low phos.	17.00-18.00
Spanish No. Africa basic, 50 to 60% nom.	12.00
Tungsten, sh. ton unit, duty paid nom.	21.00-22.00
N. F., fdy., 55%	7.00
Chrome ore, 48% gross ton, c.i.f.	$25.50-26.50
Molybdenum ores sulphide, per lb. molybdenum contained, f.o.b. mill	0.75

Manganese Ore

Prices not including duty, cents per unit cargo lots.

Caucasian, 50-52%	non. 45.00
So. African, 50-52%	nom. 45.00
Indian, 50-52%	Nominal

Sheets

Sheet Prices, Page 72

Pittsburgh — Sheet buying continues steady with only slight upward revisions noted. Galvanized production is estimated at 38 per cent of capacity, which is one point better than reported last week. Common and full finished sheets are slightly less than 35 per cent, and the absence of a seasonal upturn is disappointing to producers. Absence of large buyers from the market continues to have its effect and most orders are on small tonnages from a wide variety of manufacturers. Jobbers' requirements are slightly heavier as inventories generally are becoming depleted.

Cleveland—Order volume remains approximately at the same level as during March. Most consumers continue to specify only for actual needs and for prompt delivery. Mill operations fluctuate with incoming business. Functional allowances to jobbers have been increased to $4 on 26, 28 and 29 gage galvanized roofing and siding, with the net result that in carload lots the functional and quantity allowances have been interchanged. Inventories of most consumers are at encouraging low levels as illustrated by the need of immediate deliveries on almost all specifications.

Chicago — Sheet demand shows no betterment, still receiving scant support from the automotive industry. Miscellaneous users are buying sparingly and total business lately has not the improvement prevailing a month ago. Sheet mills are making delivery of one to two weeks on hot-rolled sheets, two to three weeks on hot-rolled annealed and cold-rolled, and three weeks on galvanized sheets.

Boston—Sheet volume has improved in some respects. Demand for galvanized is up slightly, partly seasonal, and some fabricators of small household tanks are buying blue annealed in moderately better volume. Small-lot orders for special finishes, notably stainless, are fairly steady. Current volume in galvanized, while far below last year, compares more favorably with 1936.

New York—Owing principally to miscellaneous requirements of the building trades, galvanized stock continues the most active sheet grade. However, there is a relatively good demand for certain other grades from manufacturers of low priced stoves, in particular.

Stainless steel sheet demand is holding fairly well, although in certain lines there has been a shrinkage, due to a disposition to substitute cheaper metal to cope with shrinking consumer purchasing power. However, the steadily expanding application of stainless steel to new uses has tended to sustain volume.

Cold rolled sheets of extra drawing quality and high grade charcoal tin plate are moving more actively for kitchen utensils, which are now in somewhat seasonal demand.

Philadelphia — One sheet mill in this district rolled for five days, beginning April 5 but was unable to accumulate sufficient tonnage to operate last week. This is typical of activity in eastern sheet mills. Business is irregular and mostly in special items, such as enameling and stainless sheets. Galvanized are also moving fairly well. No further automotive releases of consequence have been noted although one large interest may place about 1000 tons of cold-rolled this week. One stovemaker is operating five days per week but this is not typical of the industry, inasmuch as expected spring business has been disappoint-

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★ S. MORGAN SMITH COMPANY York, Pa.

ing. According to reports in the consuming trade a move is under way to reduce width extras on cold-rolled sheets.

Buffalo — Due to poor automotive specifications, sheet demand is slow in developing. Limited buying from miscellaneous sources is centered primarily on galvanized sheets. Mills are reluctant to build up inventories with rolling operations confined to filling orders.

Cincinnati — Miscellaneous orders for sheets turned upward last week, with activity in galvanized especially marked. Larger industrial demand, especially the automotive field, accounted for little of the new tonnage. Although not yet shown in steelmaking operations, the rolling schedules this month will be improved over March.

St. Louis—Producers and distributors of sheets report business confined exclusively to small orders for prompt shipment. Advance ordering, except of tin plate, is almost entirely absent. A further broadening is noted in the movement of galvanized roofing material to the south. Air conditioning interests account for moderate tonnages, but considerably under expectations. Stove operations are much below average for this season.

Birmingham, Ala.—Seasonal decline in demand for sheets is evident. Roofing, particularly, is somewhat duller than usual, but with prospects of renewed demand from agricultural interests.

Strip

Strip Prices, Page 73

Pittsburgh—Buying is restricted to small tonnages for miscellaneous needs and low operations in manufacturing plants have held down buying, although inventories generally are believed low. Both hot and cold-rolled strip, although showing a slight increase, remain close to 20 per cent rate. Gains are from small manufacturers with large buyers still out of the market.

Cleveland—With auto partsmakers on restricted operating schedules, specifications are limited to actual needs and for prompt delivery. Reflecting this condition, mill operations fluctuate considerably since no effort is being made to build up stocks. Prices are firm and unchanged.

Boston—Narrow cold strip buying holds the recent slight improvement, requirements for miscellaneous consumer goods of a household type accounting for much of the small gains. While nothing in the way of a broad buying demand has developed, fill-in releases are a shade better, but not enough to materially change mill operations, which average around 35 per cent. While some scattered shading is being done mill prices are generally held and such shading is the exception.

Chicago—Strip demand is steady, being made up principally of small lots from miscellaneous consumers. Automotive buying is absent and producers count on little tonnage from that direction in the near future. Mill backlogs are practically nonexistant and early delivery is available on new business.

New York—Demand for cold strip continues light, a slight gain in fill-in buying being noted by a few sellers. Indications are stocks are low, but slow fabricating operations preclude broad forward buying. Practically all orders are for prompt delivery. Fill-in purchasing is more evident for specialties. Some scattered shading is also noted, although this is not general. Hot strip demand holds dull.

Philadelphia — Little interest is noted in narrow strip. Some stampers are placing a carlot or so occasionally, usually for varied sizes. Prices are holding steady.

Plates

Plate Prices, Page 72

Pittsburgh — Plate sales remain at low levels, with miscellaneous orders failing to make up for the absence of railroad buying. Some production for rearmament programs is helping maintain schedules. Although new orders are coming out slowly, structural awards do not indicate even the usual seasonal improvement and the number of new projects which have entered the market seems to foreshadow light demand.

Cleveland—Sellers report specifications on a par with March, but inquiries in some instances have shown moderate improvement. Mill operations continue irregular, reflecting volume of orders. Prices are unchanged.

Chicago — Plate demand from structural fabricators, particularly for bridge work, is fair and moderate tonnages still are moving to tank fabricators. With only small lots being taken by railroads for car repairs and practically no buying being done for building of new railroad equipment, total plate business remains depressed, and deliveries range up to ten days.

Boston—Carlot plate orders are few. Sellers are taking little unsolicited tonnage, current orders being largely due to through canvassing of prospective customers. There is also more pressure for lower prices and some sales have been closed with extras waived or sold on a f.i.t. basis. Final official figures indicate that more boilers were made in this section during the first quarter than was estimated.

New York — With railroad and tank tonnage moving slowly and with only a small improvement in building requirements, talk in the plate market inevitably gets around to ship tonnage. There is relatively little in immediate prospect. Yet within the next 30 days bids will be opened on 16 cargo boats, requiring a total of about 62,000 tons of hull steel and in addition formal award may be released on four more, requiring approximately 12,000 tons.

Philadelphia — At least 23 shipbuilders are entering bids on the 12 cargo boats on which the maritime commission will take bids May 3, requiring about 54,000 tons of steel. Nine builders are placing bids on the four 450-foot vessels for the American Export Lines, due May 17. Railroads are buying practically no material but small orders from warehouses, tankmakers and fabricating shops are sufficient to maintain operations at about the level of recent weeks.

Birmingham, Ala. — Some new business in plates has come in during the past 10 days, bringing a slight increase in output. Inquiries current at the moment are likely to develop some additional tonnage early in second quarter.

San Francisco — Movement of plates is restricted to small lots and inquiries are slow. A proposed line for the Pacific Gas & Electric Co., San Francisco, will require 300 to 800 tons. Awards totaled only 210 tons, bringing the year's aggregate to 12,428 tons, compared with 21,494 tons for the same period a year ago.

Seattle — No important projects are up for figures, shops in this area having only small boiler and tank jobs in hand. Seattle's crosstown pipe line extension, calling for 1600 tons of plates, has not yet been readvertised. Regional forester, Missoula, Mont., received bids April 11 for furnishing up to 250 tons of culvert pipe.

Plate Contracts Placed

150 tons, in addition to 75 tons of shapes, two welded steel barges, United States engineer office, San Francisco, to Boiler Tank & Pipe Co., Oakland, Calif.

Plate Contracts Pending

250 tons, culvert pipe for U. S. forest service; bids in at Missoula, Mont.

Bars

Bar Prices, Page 72

Pittsburgh—Steel bar demand has leveled off, and although agricultural equipment manufacturers are still fairly active, this one source is not enough to bring operations up to a satisfactory level. Railroad buying has failed to show up and automotive tonnages are practically nonexistent. Buying is irregular and appears in small lots for a wide variety of uses. It is expected April figures will wind up somewhere in the vicinity of March tonnages.

Cleveland—Specifications for alloy and commercial carbon steel bars are restricted to small miscellaneous needs. Operations of most consumers are still on two or three-day schedules. Stocks are said to be relatively low as reflected by requests for immediate shipment. Prices are unchanged.

Chicago—Bar sales tend downward slightly in some directions, demand lacking the upward tendency apparent a month ago. The farm equipment industry is counted on to maintain present active schedules of around 75 per cent of capacity for at least the next 30 days.

Boston—Carbon steel bar demand is slow. Buying of forging material is limited mostly to fill-in lots. Cold-finished bar demand is spotty, several consuming industries, notably textile machinery builders, being slack. Jobbers are confining purchases to replacements and are well stocked based on current demand. Crucible Steel Co. of America was awarded the contract for 100,000 pounds of carbon steel stock for the Watertown, Mass., arsenal at 4.10c, delivered, recently bid under proposal 344.

Low bid on 105 tons, nickel steel bars, Boston navy yard, was 4.705c, delivered, submitted by Carnegie-Illinois Steel Corp., Pittsburgh, and Crucible Steel Co. of America, 5.81c being high. There were nine bidders. Bids close on 123 tons April 19, for the same yard.

Philadelphia — Two agricultural implement manufacturers in this district are operating at close to 70 per cent of capacity, thus accounting for some important bar tonnage. Requirements in other directions are light. Warehouses are providing a fair outlet, although mostly of a fill-in character. Prices are steady.

Midvale Co., Philadelphia, at $110,453.10, is low on forged steel liners for delivery at the Brooklyn and Philadelphia navy yards, bids April 1.

Buffalo—Although there is no tangible indication of the improvement being maintained, bar demand has reached the best level of the year. Aggregate business, however, is well below normal. Individual orders are restricted to present needs but a moderate release of die and reinforcing structural orders has helped sentiment.

Tin Plate

Tin Plate Prices, Page 72

Pittsburgh—Tin plate production is slightly under 60 per cent of capacity. Orders have come in a little better over the past week and it is believed the present operating rate will be maintained for some time. Export tonnages are holding at about the same pace and probably will continue to account for the same percentage of production at least until third quarter.

New York—With last year's stocks gradually being worked off, canmakers are buying tin plate more freely. Most of the improvement at present is in tin plate for general line containers but a spurt in specifications for packing cans is expected later in the month, as the season approaches

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Behind the Scenes with STEEL

Crime Marches On

■ Last week Chairman F. G. Smith of Van Dorn Iron Works, Cleveland, told stockholders that in all his 33 years in the industry he had never known of so much jail business in sight at one time. Steel bars, grills and equipment for new or improved rowdy tanks throughout the country constitute an impressive volume of business. Sly remarks have been made, mostly to the effect that, after all, crime really does pay. If, however, the efficiency of G-men has contributed to the need for so much new jail equipment, then here is an example of what government has done to improve business.

Hot Weather

■ At this time of year many columnists are addicted to writing wistful little words about Sure Signs of Spring, mentioning such things as robins in bloom, crocuses flying up from the south or similar junk. Personally we always preferred merely to look at the calendar, but we could point to all the activity on those ore boats and lake freighters down there in the harbor, new buildings beginning to take form here and there, Father priming the poor, old, squeaky pump again, or STEEL's running an article on air conditioners this week. Then of course, there's the janitor still firing merrily away, steam-bathing us half to death with the heat we were looking for all winter and didn't get.

Smoke Rings

■ Tobacco habits of any given group of gents are always of interest to us, for instance, the dozen odd editors of STEEL (please transpose dozen and odd) lurking about the home office here. Eleven of the twelve smoke pipes. Editor Kreutzberg smokes cigarettes (all kinds and lengths), cigars and a pipe resembling the Yale Bowl in contour and capacity. Editor-in-Chief Shaner is seldom seen without his pipe, while Editors Hain and Manlove alternate between pipe and cigars, not as yet being detected with cigarettes. While it would seem logical that the youngsters on the staff would be the most inveterate cigarette fiends, yet Junior Editors Sullivan, Campbell, De Eulis and Polatsek do not use the weed. The first two smoke pipes and big, black, he-man cigars, while the latter two quibble and haggle over the respective merits of every pipe fuel from London Dock or Union Leader to sawdust. Amidst the great clouds of smoke that billow through and about the offices, Miss La Verne Nock, assistant editor, sits and refrains from all forms of tobacco. Editor Birdsall likewise is a non-addict and frequently takes valuable time off to open doors and windows in the engineering room when death from strangling seems imminent. Shrdlu smokes anything that can be begged, borrowed or chiseled.

Lost

■ Speaking of smoking, we dropped in to see the Circulation Manager this morning to ask if he knew of anything funny for the column this week and also to inquire what happened to his elaborate cigarette holder, such as the boys around here have been using (you know,—the kind where you stick one cigarette in to smoke and one to filter — even the newsboy in front of the Statler has one). Anyway, the Circ. Mgr. answered both our inquiries at once. He said he could tell us at once something funny and also what happened to the weed gadget. The prized cigarette holder had inadvertently slipped into the maw of the brass spitter-atter on the floor.

—SHRDLU

for packing of peas and other products.

Labor difficulties are still being noted at three or four of the smaller canmaking plants in this district but discord has not spread to other plants so far.

Export demand for tin plate continues to decline, due in part to the unusually heavy volume last year. Foreign buyers carried considerable tonnage over into 1938, it is said.

Pipe

Pipe Prices, Page 73

Pittsburgh—Production of pipe and tubular goods continues unchanged, with oil country goods the most active. Orders are small and new orders are not being received on a large scale. Outlook is still cloudy and the smaller pipe sizes continue inactive.

Cleveland—Demand for standard steel pipe out of jobbers' stocks is substantially unchanged, although a moderate improvement for the month is expected. While nothing definite has been decided, it is expected that the Standard Oil Co. of Ohio is planning a 180-mile, 8-inch pipe line from Fostoria, O., to Cincinnati, involving approximately 10,000 tons of line pipe. If this project develops as expected, it will be the largest pipe tonnage for any single project in Ohio for a number of years. Cast iron pipe needs are unchanged, but are expected to be stimulated considerably by increased PWA activity.

Chicago—Cast iron pipe inquiries are slow, having shown little improvement since a month ago. Most inquiries are small. Possibility is seen of a future stimulus to business as a result of increased federal spending. Pending orders here include 250 tons for the Chicago sanitary district.

Boston—Heavier cast pipe orders have resulted in the district foundry stepping up operations to four days weekly. Small orders are numerous and releases against contracts are better, including steady shipments against the large purchases made several weeks ago by Camden, Me. New business includes 450 tons for Lancaster and Natick, Mass., placed with the Everett, Mass., foundry. Higher freight rates on small-diameter steel pipe amounts to about $12 a car to the jobber on consignment shipments. Until the end of April the mills will absorb this charge against old business, passing the increase on May 1 on new volume.

New York—Cast pipe inquiry for the immediate New York area is lag-

ging behind most districts in the East. Department of purchase, New York, has released part of the 1600 tons recently bid and closed April 14 on 105 lengths of 20-inch, 115 tons, Donaldson Iron Works, Emaus, Pa., low. Inquiry for about 100 tons for a sewer. Westchester county, New York, has been recalled. Utilities are buying practically nothing.

Birmingham, Ala.—A number of miscellaneous inquiries are current for cast iron pipe. Birmingham plants report nothing of an outstanding nature, although quite a sizable volume of business in the aggregate is available. Production remains on a three to four day basis.

San Francisco—Only cast iron pipe award of size went to Central Foundry Co. for 4 to 8-inch, universal pipe for Twisp, Oreg. Bids have just been opened on 433 tons of 8-inch, class 250 pipe for San Francisco. No award has yet been made on 153 tons of 6-inch pipe for Whittier, Calif., or on 150 tons of 18-inch pipe for Redding, Calif. Awards aggregated 255 tons and brought the total to date to 8948 tons, compared with 12,661 tons for the corresponding period in 1937.

Seattle—New projects are few and demand slow. Largest job is at Yakima, Wash., where bids will be received April 18 for 22,000 feet of 3 to 12-inch cast iron and accessories, 380 tons, for a water and irrigation system extension. Seattle has opened bids for 200 tons of 8-inch cast iron pipes.

Cast Pipe Placed

1599 tons, 8 to 20-inch, yard stocks, cement-lined, New York, United States Pipe & Foundry Co., Burlington, N. J., 858 tons; Donaldson Iron Works, Emaus, Pa., 413 tons, and R. D. Wood & Co., Florence, N. J., 318 tons.

225 tons, 6 to 10-inch, class 150, Natick, Mass., to Warren Pipe Co., Everett, Mass.

200 tons, various sizes, Lancaster, Mass., to Warren Pipe Co., Everett, Mass.

154 tons, 4 to 8-inch, universal pipe, Twisp, Oreg., to Central Foundry Co., New York.

115 tons, 105 lengths, 20-inch, department of purchase, New York, to Donaldson Iron Works, Emaus, Pa.

Cast Pipe Pending

380 tons, 3 to 12-inch water and irrigation system extension, Yakima, Wash.; bids April 18.

250 tons, Racine avenue pumping station, Chicago sanitary district.

200 tons, 8-inch, Queen Anne hill extension, Seattle; bids in.

Steel Pipe Pending

100 tons, approximate, 18-inch i.d. steel pontoon and shore pipe, U. S. engineer, Memphis, Tenn., bids April 25, cir. 241-F.

Wire

Wire Prices, Page 73

Pittsburgh—Incoming orders for wire products are in unchanged volume. Manufacturers' wire demand is still slow and merchant wire continues fairly active. Demand for fence wire is strong, with most mills running behind on orders.

Cleveland—Volume of merchant wire trade reached its peak some two weeks ago. Since then the recession has been moderate and in some instances holding up better than anticipated. Jobbers stocks are balanced satisfactorily at lower levels, particularly in some merchant items, such as nails. Specifications for manufacturer's wire are limited to small miscellaneous orders, reflecting general low operations among local auto suppliers.

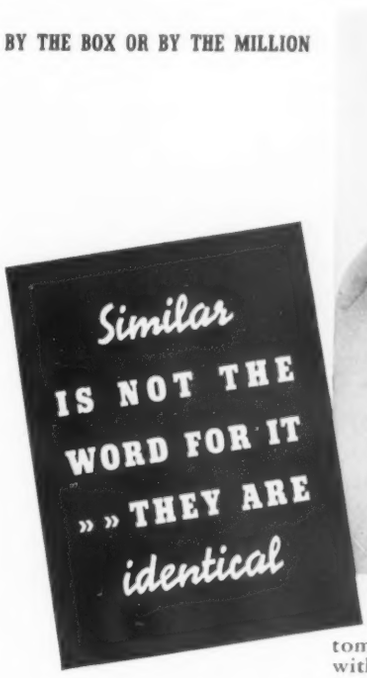
Chicago—Wire business lacks improvement prevailing during March. Demand for manufacturers' wire still is affected by restricted operations in the automotive industry as well as by light requirements of many miscellaneous users. Shipment of merchant wire products holds above first quarter average but compares unfavorably with brisk movement a year ago when distributors were increasing stocks. Purchases in farm districts are reported relatively active.

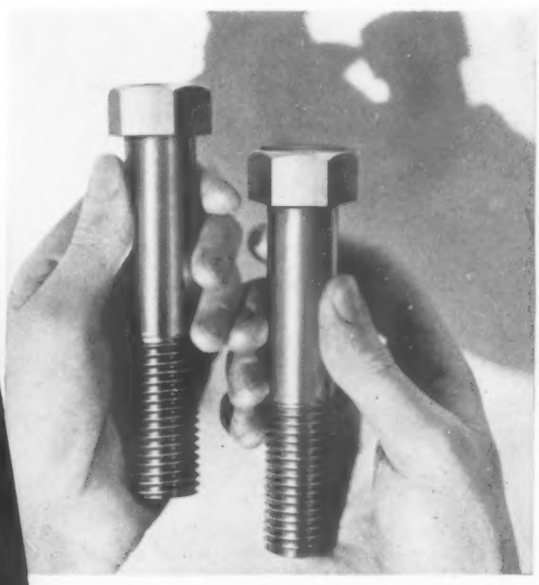
Boston—Better demand for miscellaneous specialties which developed two weeks ago is maintained in number of orders and tonnage per specification. There is no forward buying and current volume clearly reflects low and broken inventories held by a broader number of consumers. Finishing operations in some departments are few points higher but tend to be irregular.

New York—Wire demand is spotty, heavy products lagging with scattered gains in some light specialties. Wire rope buying is in steady volume. Rods continue dull. Contracts for close to 12,000 miles of field telephone wire have been placed by the signal corps, Brooklyn, Acorn Insulated Wire Co., Brooklyn, taking 7500 miles on 2400-foot reels at $27.62 per mile. Graybar Electric Co., New York, was awarded 3500 miles with an option to increase the order 50 per cent at $27.79 a mile. The latter contract is for material on 1000-foot coils and will be drawn by Blake Whitney Co., New Haven, Conn. Acorn mill contract approximates $200,000.

A second purchase of about 200

BY THE BOX OR BY THE MILLION





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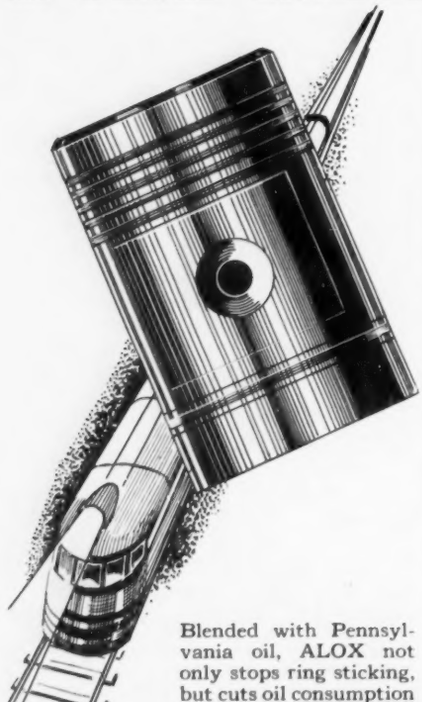

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miles of wire and cable went to Okonite Co., Passaic, N. J.; Kennecott Copper Corp., New York; General Cable Corp., New York, and John A. Roeblings Sons Co., Trenton, N. J., closing April 4.

Birmingham, Ala.—Recession in spot business for wire products has developed in the past few days. Mills attribute this fact to a tendency on the part of jobbers to practice hand-to-mouth buying. Mill stocks, which have been somewhat heavy, will be drawn upon to a certain extent to satisfy the requirements of the trade.

Rails, Cars

Track Material Prices, Page 73

Deadline for substitution of arch bar trucks by cast steel side frames on freight cars for interchange between lines has been postponed again, this time to July 1. Meanwhile car buying is at a standstill. Current buying includes three 50-ton transport cars by Mathieson Alkali Works Inc., which is inquiring also for three to five 40-ton tank cars.

Carnegie-Illinois Steel Corp. plans repairs to 60 coke hopper cars. Chilean railroads are inquiring for 50 flats and 50 box cars, all of 30 tons capacity. The navy contemplates early award of six box cars and three flats to Haffner-Thrall Car Co., Chicago, two tank cars to American Car & Foundry Co., New York, and one box car to Magor Car Corp., New York.

Carnegie-Illinois Steel Corp. has booked 1100 tons of rails for the Union Railroad, 3500 tons from Bessemer & Lake Erie, both United States Steel Corp. subsidiaries.

Car Orders Placed

Mathieson Alkali Works, there 50-ton transport cars to American Car & Foundry Co., New York.

Navy, six box and three flat cars to Haffner-Thrall Car Co., Chicago; two tank cars to American Car & Foundry Co., New York; one box car to Magor Car Corp., New York. Award to be made soon.

Rail Orders Placed

Bessemer & Lake Erie, 3500 tons, Union railroad 1100 tons, to Carnegie-Illinois Steel Corp., Pittsburgh.

Car Orders Pending

Ferrocaril de Arica, Chile, 50 flat and 50 box cars, all 30-ton capacity; bids asked.

Mathieson Alkali Works, three to five 40-ton tank cars; bids asked.

Shapes

Structural Shape Prices, Page 72

New York—Small bridge inquiries are more numerous, 700 tons for New York state closing April 26, but structural steel inquiry is well below normal and generally restricted to public work. For a hangar, North Beach airport, closing April 19, slightly more than 2000 tons is required.

Pittsburgh—A somewhat better tonnage is reported in new projects, reflecting a decided seasonal upturn. Contracts recently placed were in excess of 5000 tons and nearly 10,000 tons are pending.

Cleveland—Inquiries continue in small volume from private sources and awards are in lots well under 100 tons. Public work has failed to develop as anticipated, but considerable tonnage for grade crossings is said to be awaiting definite action by state authorities. Fabricated prices are weak on limited tonnage.

Chicago—Most new inquiries are for public jobs, principally bridges. Plans are being prepared for a Mississippi river bridge at Rock Island, Ill., expected to take about 4000 tons. A bridge at Lincoln, Ill., involves about 1200 tons while about 1000 tons is represented by various smaller bridges. Awards are light and unimproved.

Boston—While Vermont has an inquiry out for bridges taking 195 tons and bids close this week on a 617-ton span at North Kingston, R. I., structural steel activity is slowed by a lack of bridge requirements in this territory. Several school and other public work construction projects have developed, taking about 500 tons. A Boston contractor has also bought 450 tons for a state hospital, Butler, Pa.

Philadelphia — John McShain Inc., Philadelphia, is low bidder on Security prison project near Mount Gretna, Pa., requiring 550 tons of structural and 2000 tons of formed bars, bids April 14. Bids are due April 22 on White Hill industrial

Shape Awards Compared

	Tons
Week ended April 16	**19,556**
Week ended April 9	**29,484**
Week ended April 2	**17,510**
This week, 1937	**28,021**
Weekly average, year, 1937	**16,060**
Weekly average, 1938	**15,723**
Weekly average, March	**16,309**
Total to date, 1937	**458,438**
Total to date, 1938	**251,569**

Includes awards of 100 tons or more.

school, Harrisburg, Pa., requiring 1500 tons. This is the last of Pennsylvania state authority work and fabricators see little ahead other than Harrisburg-Pittsburgh toll highway job.

San Francisco — While several large lots were placed and over 4300 tons pending new inquiries were for lots of less than 100 tons. Featuring the awards were 2257 tons of sheet steel piling for United States engineer office, Los Angeles. Columbia Steel Co., Bethlehem Steel Co. and Inland Steel Co. submitted identical bids. Awards aggregate 5803 tons and brought the total for the year to 35,313 tons compared with 71,371 tons in 1937.

Seattle—Award of contracts for outlet pipe trash racks, rack guides bearing and tie plates and other steel items for Coulee dam has been divided by reclamation bureau, about 4000 tons going to Bethlehem Steel Co. and approximately 1000 tons to Mississippi Valley Steel Co., Melrose Park, Ill. No new projects involving sizable tonnages have developed.

Shape Contracts Placed

4000 tons, trash racks, etc., Coulee dam project, to Bethlehem Steel Co.

2500 tons, college buildings, Pennsylvania state college, to Bethlehem Steel Co., Bethlehem, Pa.; through McCloskey & Co., Philadelphia.

2257 tons, steel sheet piling, United States engineer office, Los Angeles; 405 tons to Inland Steel Co., Chicago, 1852 tons to Bethlehem Steel Co., Bethlehem, Pa.; Columbia Steel Co., San Francisco, only other bidder, all bids identical.

1500 tons, Lancaster avenue bridge, Ft. Worth, Tex., to Virginia Bridge Co., Roanoke, Va.

1000 tons, rack guides and other items, Coulee dam project, to Mississippi Valley Structural Steel Co., Melrose Park, Ill., and John W. Dean, Denver.

900 tons, extension to annealing building, American Rolling Mill Co., Middletown, O., to Stupp Bros. Bridge & Iron Co., St. Louis, Mo.

850 tons, public school 246, Brooklyn, N. Y., to Lehigh Structural Steel Co., Allentown, Pa.; bids on steel direct, fabricating and erecting, April 12.

610 tons, Rice stadium, Houston, Tex., to Mosher Steel Co., Houston.

450 tons, armory, Morristown, N. J., to Selbach-Meyer Co., Union City, N. J.

450 tons, store building, Neisner Bros. Inc., Buffalo, to Bethlehem Steel Corp., Bethlehem, Pa.

440 tons, bridge FAGM-4, Jefferson county, Alabama, to Virginia Bridge Co., Birmingham.

435 tons, buildings, state hospital, Butler, Pa., to Fort Pitt Bridge Works, Butler, Pa.; Matthew Cummings Co., Boston, general contractor.

385 tons, bridge 36.6, St. Louis-San Francisco railroad, Pacific, Mo., to Stupp Bros. Bridge & Iron Co., St. Louis.

325 tons, bridge, section 33VF, East St. Louis, Ill., to Fort Pitt Bridge Works, Pittsburgh.

300 tons, viaduct, WPGS-437, St. Onge, S. Dak., to Bethlehem Steel Corp., Bethlehem, Pa.

300 tons, planetarium, Buhl Foundation, Pittsburgh, to Pittsburgh Bridge & Iron Co., Pittsburgh.

280 tons, bridge, Section 3F, Greene county, Greenfield, Ill., to Superior Structural Steel Co., St. Louis.

265 tons, dormitory, teachers college, Slippery Rock, Pa., to Pittsburgh Bridge & Iron Co., Pittsburgh.

250 tons, bridge, section 35-IF, Bond county, Pocahontas, Ill., to Stupp Bros. Bridge & Iron Co., St. Louis.

235 tons, school, Muscatine, Iowa, to Rock Island Bridge & Iron Works, Rock Island, Ill.

200 tons, state highway bridge, Odenton, Md., to Pittsburgh-Des Moines Steel Co., Pittsburgh.

171 tons, state hospital project, Marlboro, N. J., to Selbach-Meyer Co., Union City, N. J.

160 tons, Fox film studio, 447 West Fifty-third street, New York, to Lehigh Structural Steel Co., Allentown, Pa.

150 tons, terminal, Shipside Contracting Co., Houston, Tex., to Mosher Steel Co., Houston.

140 tons, state highway bridge, FAGM-594, Walnut, Iowa, to Des Moines Steel Co., Des Moines, Iowa.

140 tons, sag rods and crane tracks, specification 3731, Los Angeles, to Bethlehem Steel Co., Los Angeles.

138 tons, crossing near Keystone, White Pine county, Nevada, to Provo Foundry & Machine Co., Provo, Utah.

135 tons, garage, Eastern Massachusetts street railroad, Fall River, Mass., to John R. Cox Co., Fall River.

130 tons, viaduct, FAP-158-A, Vermillion, S. Dak., to Des Moines Steel Co., Des Moines, Iowa.

125 tons, bridge SP-899, Cumberland county, Kentucky, to Vincennes Bridge Co., Vincennes, Ind.

120 tons, bridge No. 158A, Clay county, South Dakota, to Des Moines Steel Co., Des Moines, Iowa.

115 tons, high school, Richmond, Ind., to Joseph T. Ryerson & Son Inc., Chicago.

100 tons, theatre, Ocean City, N. J., to Morris Wheeler & Co. Inc., Philadelphia.

Unstated tonnage, miscellaneous, two main hangar doors, 162 feet, three inches wide, by 42 feet, three inches high, with operating mechanisms, motors, controls, structural steel supports, counterweights and steel catwalks, to Truscon Steel Co., Youngstown, O., $49,831; bids April 13, pro. 201354, state procurement officer, treasury department, New York.

Shape Contracts Pending

4000 tons, bridge, Rock Island, Ill.; plans being prepared.

2100 tons, seaplane hangar, North Beach airport, New York.

2000 tons, superstructure, U. S. government building, world's fair, New York, bids postponed to April 26 from 12.

1200 tons, Illinois river bridge, Lincoln, Ill.; bids April 22.

1000 tons, Chotawatchee bay bridge, DeFuniak Springs, Fla., for Walton county bridge authority.

1000 tons, Belgian building, world's fair, New York.

550 tons, and 2000 tons of formed bars, Security prison, Mount Gretna, Pa.; John McShain Inc., Philadelphia, low, bids April 14.

467 tons, state bridges, Illinois.

400 tons, superstructure, Sardis dam, Sardis, Miss.

335 tons, bridge, Lafayette river, Norfolk, Va.

300 tons, Rockne memorial building, University of Notre Dame, Notre Dame, Ind.

290 tons, bridge, Jackson, Miss.

285 tons, state bridge, Burt, N. Y.; bids April 26.

275 tons, state bridge, Pleasantville, N. Y.; bids April 26.

250 tons, bridge, Delphi, Ind.

240 tons, school building, board of education, West Newton, Mass.
230 tons, apartment building, L. C. and N. K. Towers, Toledo, O.
230 tons, railway and highway bridge, Pensacola Dam, Okla.
220 tons, case structures, Magnolia Petroleum Co., Chaison, Tex.
215 tons, school, Greigsville, N. Y.; bids April 18.
215 tons, addition, hospital, New Rochelle, N. Y.
200 tons, power house alterations, National Folding Box Co., New Haven, Conn.
200 tons, trash racks, Rutledge, Tex.
200 tons, high school, Iowa City, Iowa; bids April 30.
200 tons, overhead crossing, project FAGH-739, Manilla, Iowa.
200 tons, arsenic plant and loading platform, American Smelting & Refining Co., El Paso, Tex.
200 tons, railroad bridge, project FAGH-462-E, Goodman, Wis., for state.
195 tons, three bridges, Waitsfield, Vt. state projects 157-L, M and N, McAllister, Irasville and Sawmill spans; bids April 22, H. E. Sargent, commissioner of highways, Montpelier, Vt.
183 tons, bureau of reclamation, invitation 44,281-A, Earp, Calif.; bids opened.
165 tons, armory, Manchester, N. H.; rebid April 15.
160 tons, transmission towers, specification 1051-D, Boulder dam, Nev.; Bethlehem Steel Co., San Francisco, low.
160 tons, sheet and H-piling, Nome, Alaska, harbor improvement; bids in to U. S. engineer, Seattle.
150 tons, beam spans for bridge 0-2.5, Wabash railway, Hannibal, Mo.
150 tons, state highway bridge 170, project 6348-A, Marteri, Wis.
140 tons, state highway bridge 391, project 5414, Gale, Wis.
140 tons, theatre stage, Paper Mill playhouse, Millburn, N. J.
125 tons, state bridge, Chenango county, New York; bids April 26.
110 tons, I-beam bridges, project FA-267, Tilton and Thornburg, Iowa.
105 tons, shapes and bars, post office, Janesville, Wis.; bids May 13.
100 tons, steel transfer bridge, 12th street, Delaware, Lackawanna & Western railroad, Hoboken, N. J.; American Bridge Co., Pittsburgh, low, bids April 11.
100 tons, state undergrade crossing, Albia, Iowa.

Reinforcing

Reinforcing Bar Prices, Page 73

New York — Including highway mesh and an 800-ton contract for an approach section, Lincoln tunnel, Union City, N. J., reinforcing buying approximates 1500 tons with small-lot inquiry and purchasing more active. The state procurement officer has placed 140 tons of expanded metal reinforcement and 100,000 square feet of electrically welded wire mesh. Prices on the expanded metal were firm and uniform, the award being made by lot.

Pittsburgh — The price situation on reinforcing bars is unsteady in several districts. With the advent of spring weather, projects are coming out in greater number and several fairly large tonnages placed.

Boston — Award of 825 tons by a Boston contractor for a hospital, Butler, Pa., with a district sales office, is outstanding here. About 850 tons, partly mesh, remains to be placed for Connecticut bridges and roads. Small-lot buying and inquiry is somewhat more active.

Cleveland — Reinforcing awards continue in small volume, limited to miscellaneous tonnages from private sources. Pending work is composed primarily of public projects, the two river piers and nine land piers for the Main street bridge, Cleveland, being outstanding. Operations of most fabricators follow the volume of incoming business as backlogs have been cleared up.

Chicago — While shipments are fairly steady, new business is quieter than a month ago and seasonal improvement is lacking in new inquiries. Road work is productive of but small orders though additional business is in prospect. Private work generally calls for individual lots of less than 100 tons.

Philadelphia — Security prison, taking 2000 tons, on which John McShain is low, is the most important job before the trade. An increasing number of alteration and addition projects is noted with the advent of more favorable weather, but these are small individually. State of Pennsylvania is taking bids on 15 construction projects April 29. State also asked to build six schools, but plans are indefinite.

San Francisco — Bids have been opened on 4223 tons for the United States engineer office, Los Angeles, under invitation ER 509-38-419, on which Bethlehem Steel Co. is low. Awards totaled 1098 tons and brought the aggregate for the year to 26,966 tons, compared with 26,255 tons last year.

Seattle — Few new projects involving reinforcing materials are up for early consideration and rolling mills are operating only as orders accumulate. Small tonnages also are lacking as construction activity is below normal. Columbia Steel Co. has taken 700 tons for the Washington-Idaho Snake river bridge. Reclamation bureau is considering bids for 560 tons involved in Wyoming projects.

Concrete Bars Compared

	Tons
Week ended April 16	12,772
Week ended April 9	2,872
Week ended April 2	2,173
This week, 1937	6,694
Weekly average, year, 1937	6,266
Weekly average, 1938	5,321
Weekly average, March	3,893
Total to date, 1937	66,712
Total to date, 1938	85,142

Includes awards of 100 tons or more.

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Reinforcing Steel Awards

5000 tons, rail steel, Possum Kingdom dam, Brazos river, near Mineral Springs, Tex., straight bars to Texas Steel Co., Fort Worth and bent bars to Southern States Steel Co., Dallas, Tex.; bids Feb. 24, Ambursen Engineering Corp., New York, consulting engineers.
1400 tons, Crooked creek dam, Ford City, Pa., to Bethlehem Steel Co., Bethlehem, Pa., through George M. Brewster

& Son, Bogota, N. J., general contractor.
1400 tons, bridge, Long Island railroad, Lynbrook, N. Y., to Jones & Laughlin Steel Service Inc., Long Island City, N. Y.; through Poirier & McLane Corp., New York.
825 tons, buildings, state hospital, Butler, Pa., to Concrete Steel Co., New York; Matthew Cummings Co., Boston, general contractor.
800 tons, approach, North Bergen to Bergenline avenue, Union City, N. J., Lincoln tunnel contract MHT-72, to Joseph T. Ryerson & Son Inc., Jersey City; James A. Mitchell & Co., Jersey City, general contractor.
700 tons, Washington-Idaho Snake river bridge, to Columbia Steel Co., Seattle.
545 tons, college buildings, Pennsylvania state college, to American Steel Engineering Co., Philadelphia; through McCloskey & Co., Philadelphia.
338 tons, shop for high school, Berkeley, Calif., to Ceco Steel Products Co., San Francisco.
300 tons, highway project, Kaufman county, Texas, to Alamo Iron Works, San Antonio, Tex.; Briggs-Darby Construction Co., Pharr, Tex., general contractor.
280 tons, mesh, highway project, Northern state parkway, sections 2 and 3, Nassau county, New York, to Wickwire-Spencer Steel Co., New York; Garofano Construction Co., Inc., general contractor.
180 tons, Carthage grade separation, Hamilton road, contract 539-E, state highway 43, Cincinnati, to Truscon Steel Co., Youngstown, O., through Penker Construction Co., general contractor.
140 tons, expanded metal reinforcement, state procurement officer, treasury department, New York, to Joseph T. Ryerson & Son, Inc., Jersey City, by lot; bids April 4. American Steel & Wire Co., New York, awarded 100,000 square feet electrically welded mesh; bids same date.
135 tons, mesh, highway, Concord-Boscawen and Franklin, N. H., to American Steel & Wire Co., New York; New Haven Road Construction Co., New Haven, general contractor.
125 tons, First Church of Christ Scientist, Sacramento, Calif., to Palm Iron & Bridge Works, Sacramento, Calif.
104 tons, school building at West Milton, O., to Poliak Steel Co., Cincinnati, through Norton & Nadalin, general contractors, Columbus, O.
100 tons, swimming pool, Wellesley college, Wellesley, Mass., to Northern Steel Co., Boston.
100 tons, Catholic home for aged, Fall River, Mass., to Tucker & Fox, Boston.
100 tons, Woolworth store building, Cincinnati, to Poliak Steel Co., Cincinnati, through Frank Messer & Sons, general contractor, Cincinnati.
100 tons, six additions to Eastmont and Montebello high schools, Montebello, Calif., to unnamed interest.
100 tons, crossing near Keystone, White Pine county, Nevada, to Colorado Fuel & Iron Co., Pueblo Co.

Reinforcing Steel Pending

4223 tons, invitation ER 509-38-419, United States engineer office, Los Angeles; Bethlehem Steel Co., Los Angeles, low.
1000 tons, Racine avenue pumping station, Chicago sanitary district.
560 tons, reclamation projects in Wyoming; bids in.
300 tons, Mt. Greenwood outfall sewer, Chicago.
290 tons, mesh, highway project, Nassau county, New York; Andrew Weston Co., Woodmere, N. Y., general contractor; bids April 12.
275 tons, Wasena bridge, Roanoke, Va.
225 tons, warehouse, Anthony Pallazolla, Cincinnati; bids in.
165 tons, mesh, highway, Avon-Simsbury, Conn., to Arute Bros. Inc., New Britain, Conn.; bids April 4.
150 tons, state procurement officer, treasury department, New York; bids April 18.
150 tons, substructure, engine and machine shop, Boston Elevated railroad, Everett, Mass.
127 tons, highway work in Marin county, California, for state; bids April 27.
120 tons, filtration plant, Huntingdon, Pa.
108 tons, highway work in Cochise county, Arizona; bids being taken.
101 tons, bridge, in Los Angeles county, California, for state; bids April 28.
100 tons, building, Goldenrod Ice Cream Co., Chicago.
100 tons, water works, Benton Harbor Mich.
100 tons, Catholic hospital, Anchorage, Alaska; McDonald Construction Co., Seattle, general contractor.
100 tons, bars, also 110 tons of sheet steel piling, state cancer clinic, Buffalo, N. Y., bids April 21.
Unstated, $250,000 campus overpass, Washington State college, Pullman; bids soon.
Unstated, $120,000 state underpass, Klamath Falls, Oreg.; bids soon.
Unstated tonnage, courthouse, Kalamazoo, Mich.; bids April 21.

Pig Iron

Pig Iron Prices, Page 74

Pittsburgh — Foundry production schedules are slow as the larger producers are still working on heavy inventories, and the smaller foundries are buying only for immediate needs. Present orders are lighter due to fact some orders were received before increase in freight rates. Prices continue firm, with no attempts to shade prices.

Cleveland—Shipment of merchant pig iron has done little more than hold its own this month. Foundries continue to operate on substantially reduced schedules and order only on a hand to mouth basis. In a few isolated instances inventories are out of line with current operations, but in most instances foundries are placing orders for prompt delivery, indicating actual need. Railroad foundries and those serving the automotive industry have little business, with most of the present requirements originating from farm equipment concerns. Prices are firm.

Chicago — Shipments are steady, holding at about the average March rate, with little change expected in the April total. Foundry operations lack improvement and with little pickup in immediate prospect, new business in pig iron is expected to continue quiet. Some foundries still have excess inventories, which hold down new business. Market is steady at $24, furnace, for No. 2 foundry and malleable.

Boston—Pig iron stocks held by consumers are large only when considering current low foundry operations which in numerous instances are around 30 per cent and in some cases less. Even a moderate improvement in melt would be reflected in buying in the opinion of sellers. The smaller consumers as a rule have no stocks to speak of and even

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under present conditions are forced to buy small lots from time to time. The larger users are still drawing on inventories without replacement. This is especially true of the textile mill equipment plants. Steel plants are not buying and have substantial supplies in most cases. Makers of castings for the machinery trade are still relatively the most active, but backlogs are dwindling. Jobber, textile and paper mill equipment foundries are slow. The district pipe foundry, however, has stepped up.

New York — With foundry melt showing little improvement, pig iron business remains light, with orders confined largely to carlots. Larger consumers are buying practically nothing, as they are still drawing on stocks laid in last year. Export demand is spotty, with few inquiries involving more than 500 tons.

Philadelphia—An inquiry is before trade for 1000 tons with two or three others ranging from 250 tons upward. It is now believed consumers are more assured prices will not decline although this still is a factor in current dullness. Foundry melt is holding up well. At least one jobbing foundry is operating five days a week, but general average probably is two or three.

Buffalo—Although pig iron shipments continue to lack volume, producers were encouraged by a minor gain in buying from automotive manufacturers. It was the first buying of any consequence from motormakers in several weeks, and even though the improvement was slight, it tended to bolster sentiment.

Cincinnati — Pig iron shipments, both Northern and Southern, fail to improve and it is possible tonnage for April will be lighter than in March, some iron having been moved last month prematurely to gain freight rate advantages. Melt for stoves tends upward, but demand for agricultural implements is less. Foundry inventories are low and few have entered contracts for future needs.

St. Louis—The melt of pig iron in this area is steady, with average daily rate about even with that prevailing in March. Jobbing foundries are getting some new orders for miscellaneous castings and are running three to four days per week. Their backlogs, however, are light. Stove foundries are operating principally on stock and report that new orders are disappointingly light, with prospects for the next two or three months not particularly bright. The slow spot continues to be steel foundries which specialize in railroad castings.

Birmingham, Ala.—Marked sluggishness is evident in pig iron although there has been no material reduction in the melt since the first of the year.

Ferroalloys

Ferroalloy Prices, Page 74

New York—Ferromanganese shipments are holding their own, showing little variation this month. With the immediate outlook still dull in steel production, ferromanganese sellers look for little early improvement.

Meanwhile, the market is holding at $102.50, duty paid, Atlantic and Gulf ports, with domestic spiegeleisen, 19 to 21 per cent, also steady at $33, Palmerton, Pa., and 26 to 28 per cent, at $39.

Scrap

Scrap Prices, Page 76

Pittsburgh—Substantial sale of No. 1 heavy melting steel here at $12.50 has lowered the market 50 cents a ton to $12 to $12.50. Aside from this, scrap activity is low and the market weak. Cast grades are reported off considerably from present quotations, although no sale for ultimate consumption has been made. Scrap sold from the recently closed Pennsylvania railroad list represented an unusually small tonnage. Steel wheels were sold to dealers at slightly over $17 per gross ton, and knuckles and couplers brought somewhat less, although quantities were small. Continued weakness in the export market is expected to have a depressing influence on local prices.

Cleveland — Except for some shipments of No. 2 steel and blast furnace material the scrap market here shows no activity and prices are nominal and unchanged.

Chicago—Heavy melting steel is down 50 cents on a small sale at $11.50. Most mills are out of the market and there is little prospect of any early pickup in demand. Offerings are light and sellers find it difficult to buy heavy melting steel at less than $11.25. Railroads are issuing fewer lists and these generally are small.

Boston — Heavy melting steel prices for export have dropped again, reflecting slackening demand. Brokers have lowered bids for No. 1 to $12, docks, and now offer $11 for No. 2. Boat loading is less active, one cargo leaving this week for Japan with several thousand tons. Most scrap against European orders has been shipped or covered and foreign buyers are reluctant to take tonnage still due them. Domestic buying for both New England and Pennsylvania delivery is slow, a few small lots of cast grades moving to district foundries. Prices, while nominal for district shipment, are easy, notably on heavy breakable, textile and machinery cast.

New York—Scrap prices continue to sag, brokers lowering prices on several grades for domestic shipment, although buying is light, offering little test. For export, prices are unchanged. Foreign business continues to slow down with shipments against orders about complete with the outlook for immediate tonnage buying abroad uncertain. Domestic consumers have practically

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no orders to be filled and are buying in small lots.

Philadelphia — No. 1 heavy melting steel is 50 cents lower on a sale of moderate tonnage to a mill in this district, at $13.50. No mill is now willing to pay over this figure. Some business has been done in No. 2 steel which establishes this grade also at a lower level. Practically the entire list shows a weaker tendency. It is pointed out that the Philadelphia market is out of line with other centers and a further decline is expected unless export demand revives. This is believed unlikely in view of a reported sale at New York on the basis of $13 for No. 1 steel and $12 for No. 2. About 20,000 tons is still scheduled for export from Philadelphia but this was previously covered at $14 for No. 1 and $13 for No. 2. Foundries show little interest.

Buffalo—Practically the entire iron and steel scrap list was subjected to another price slash of 50 cents a ton as bids placed at the lower levels were readily filled.

The chief consumer of the area returned to the market, after an absence of about a week, with a $12 bid for No. 1 heavy melting steel, a drop of 50 cents. With the usual differentials prevailing on other grades the mill easily gathered 8000 tons.

Detroit—Activity in the scrap market last week was at low ebb, and beside a tonnage of bundles from Hudson, no lists came up for bidding. Prices are unchanged, and bundles continue about $8.75 per ton maximum. Automobile production is increasing and supply of scrap in the next six weeks should be plentiful, another bearish factor on prices.

Cincinnati—Dealers' prices on iron and steel scrap continue to sag, with most items 25 cents lower. Mill demand has disappeared, reflecting policy of these consumers to trim inventories regardless of quotations on replacement material. Some items from recent railroad lists were taken at lower prices for yards.

Birmingham, Ala. — Sluggishness continues in scrap with small commitments for cast material. Prices are nominal, with a downward tendency.

St. Louis—During the past week or ten days iron and steel scrap prices continued downward, and with the additional cuts, the average is not much above the low reached in 1932. Sales have served to steady the market to some extent, also to reduce the eagerness of smaller dealers to sell. One leading east side mill is reported to have purchased 5000 tons of No. 2 heavy melting steel at $10.50, and another interest took 5000 tons of No. 1 and 2 heavy melting and steel specialties, paying slightly below $10.50. The orders, which are for delivery through the balance of the second quarter, were split among several dealers.

Seattle — Conditions are unchanged, with no new orders from Japan and local mills uninterested. Foundry consumption is below normal and turn-over is of small proportions. Old commitments have been generally filled by the dispatch of several full cargoes to Japan. The going freight rate on steel scrap is $4.50 to $4.75 a ton, about $3 under the trans-Pacific conference level, made possible by chartering full cargo carriers. Receipts at tidewater are small as present prices are unattractive to suppliers in the interior.

Warehouse

Warehouse Prices, Page 75

Philadelphia—Recent revision of quantity differentials on hot-rolled products has excited some interest by consumers and encouraged placing of larger individual orders. Total warehouse volume shows further slight gain which is fairly well diversified although seasonal influences are noted in wire and galvanized sheets. Base prices are fairly steady.

Cleveland — Warehouse distributors report shipments fairly steady, about on a par with March. In most instances orders have leveled off. While the volume of orders is fairly satisfactory individual tonnages are disappointing. Inventory positions of most jobbers are at new low levels, but are satisfactorily balanced. Price adjustments due to freight rate increase have had little effect on volume of business.

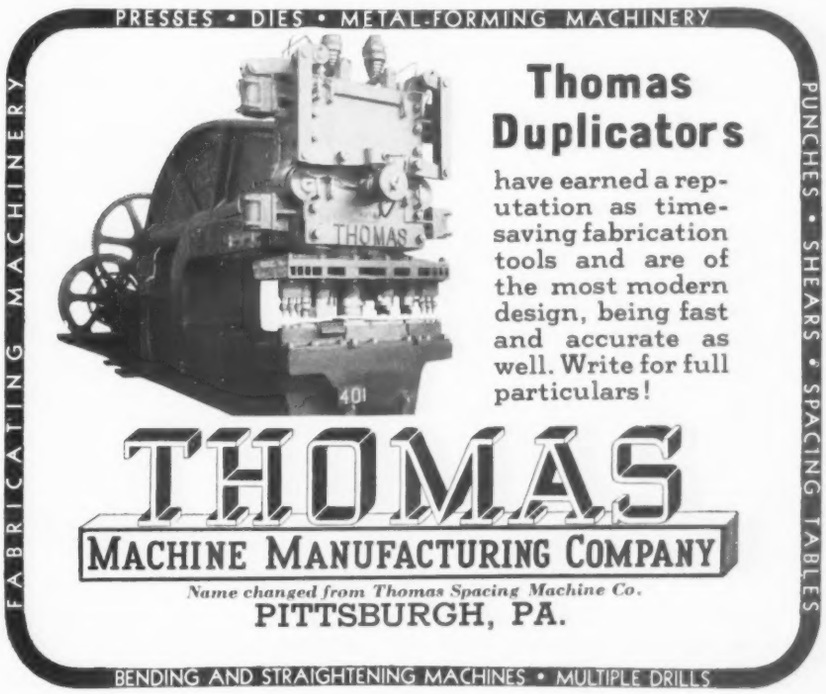
Chicago — Sales recently have lacked the improvement prevailing a month ago and April business is expected to be equal to or moderately below the March volume.

Boston—Recent slight improvement is maintained, although in some districts demand has again flattened out and warehouses have noted little improvement. First quarter sales are estimated between 30 to 35 per cent under last year, but that quarter in 1937 was exceptional. New prices are effective and steady with the exception of usual scattered shading.

Buffalo — Warehouse distributors report business is holding fairly steady around the level of the preceding month. Occasional flurries develop but are not sustained.

Cincinnati—Warehouse sales continue close to the March pattern. District demand shows proportionately less shrinkage because of general conditions than some other districts. Some small tonnages of building materials have been booked, breaking into recent dullness affecting these materials. Prices are unchanged.

St. Louis—Routine demands are holding warehouse sales well up to the March average daily basis, with one leading interest reporting a noticeable increase. There are signs of expansion in the general manufacturing trade, including tool steel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and shovel stock. Oil country goods continue active, particularly drilling items. Purchasing by the railroads continues on a hand to mouth basis, and is confined principally to shop materials.

Seattle—Business is spotty, orders involving small tonnages for scattered items. Public works are furnishing some volume but turnover is below last year's levels. Mill buying is only occasional. Warehouses have not yet decided on price increases in proportion to freight advances by both rail and intercoastal lines.

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Iron Ore

Iron Ore Prices, Page 76

Cleveland—The 1938 ore carrying season in the upper lake ports was officially opened last week with the arrival of the ore carriers PHILIP BLOCK and JOSEPH BLOCK of the Inland Steel Co.'s fleet. Iron ore prices for the season have not been determined, no inquiries having appeared.

Receipts of iron ore at lower lake front furnaces in 1937 and shipments from lower lake ports for the 1938 season, with dock balances April 1 follow:

Port	Receipts	Shipments	Doc. bal. Apr. 1,'38
Buffalo	5,851,276	750,286	108,576
Erie	2,745,295	2,516,672	286,287
Conneaut	9,635,048	9,020,809	1,892,451
Ashtabula	6,572,771	5,724,833	1,600,704
Fairport	1,904,419	1,830,850	480,218
Cleveland	10,082,766	7,497,470	599,035
Lorain	3,914,834	1,632,816	246,842
Huron	967,617	954,932	217,175
Toledo	1,923,960	1,178,244	55,933
Total	43,597,986	31,106,912	5,487,221
Year ago	31,431,020	25,711,230	2,851,951

Steel in Europe

Foreign Steel Prices, Page 75

London—(*By Cable*)—Steel production in Great Britain in March was the highest since November. Total of ingots and castings in March was 1,115,800 gross tons, compared with 1,057,600 tons in February and 1,178,300 tons in November. This is an increase of 58,200 tons over the preceding month, largely due to three additional days.

Pig iron output in March was 714,600 tons, compared with 693,300 tons in February, an increase of 21,300 tons. Blast furnaces active at the end of March numbered 118, compared with 124 at the end of February.

Application of the 33 1/3 per cent import duty on pig iron will help reduce stocks accumulated through recent heavy imports. The market is now dull, with most melters covered to the end of June, when revision of prices is thought possible. Exports of pig iron are negligible. Trade in heavy steel products is active, with demand for light products dull. Sheets and tin plate are quiet.

The Continent reports slight improvement in export sales. Renewal of the European steel entente following its expiration in June is expected.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 73

Bolt, nut and rivet specifications are slow and generally unchanged. Little possibility of an increase in demand from railroads or equipment builders is seen for the next 60 days and prospects for increased consumption by automotive partsmakers also are unfavorable. Miscellaneous consumers are specifying in small lots for early needs, with little change in total volume. Demand from jobbers is steady.

Nonferrous Metals

Nonferrous Metal Prices, Page 74

New York—Interests in domestic nonferrous metal markets were encouraged last week by the increase in activity, stimulated partly by the government's plan for "spending" business out of the "recession." Straits tin fluctuated between 38.50c and 39.00c while other metal prices held firm.

Copper—The daily average rate of sales increased to above the 1000-ton level, reflecting a strengthening in the foreign market to around 10.00c, c.i.f., and the gradual improvement in operations at fabricating plants. World stocks of refined copper increased 11,120 tons, the increase in domestic stocks of 16,540 tons having been counteracted in part by the decline of 5420 tons in foreign stocks. Foreign shipments increased to a new high while the domestic movement was the heaviest since last November. Active demand for spot export metal aided in supporting the market on a firm basis of 10.00c, Connecticut.

Lead—Reticence on the part of sellers to dispose of their holdings at present levels coupled with curtailment of output by several producers, tended to firm the market at 4.50c, New York, and 4.35c, East St. Louis.

Zinc—Sellers were reluctant to book orders for delivery beyond nearby positions due to the low 4-cent level despite large stocks. On Friday all but one seller advanced prime western prices ¼-cent to 4.25c, East St. Louis. The future trend depends largely on stocks for higher prices. Production of galvanized sheets has increased steadily to 38 per cent of capacity.

Tin—Prices continued to fluctuate in line with the trend of security prices in Wall street and changes in the industrial outlook in this country. Increased controversy over the International Tin agreement and proposed control schemes becloud the market's outlook. Straits spot closed around 39.25c.

Antimony—Belgian and French antimony offerings at 12.00c, c.i.f. New York, enlivened an otherwise dull market. Chinese spot was quoted nominally unchanged at 15.75c, duty paid New York, while American spot held at 13.75c.

Cold-Finished

Cold Finished Prices, Page 73

Pittsburgh — Downward trend in cold-finished steel orders appears to have halted and current April orders are about equal to the volume received in March, up to the same date. Although March tonnages were somewhat better than February on a percentage basis, the total figure was low and April tonnages are not expected to exceed the March figure. Large users are still out of the market and jobber orders continue to play an important part.

Canadian Builder Books New Zealand Order

Canadian Bridge Co. Ltd., Walkerville, Ont., has been awarded a contract for 3500 tons of galvanized transmission tower material by the department of public works, New Zealand.

Reader Comments

(*Concluded from Page* 11)

terial were stored in a distant public bonded warehouse.

As the manufacturer makes payments on his loan proportionate amounts of material are released by the resident custodian and are taken out of the field warehouse for immediate fabrication. All transfer expense is thereby eliminated.

Frequently a top-heavy inventory has been built up at the expense of cash on hand. In many industries this situation is being remedied simply and soundly by creating a field warehouse around this material and borrowing on the warehouse receipts as issued.

H. PAULMAN
Crooks Terminal Warehouses Inc., Chicago.

Much Ore Imported

Baltimore—Three large shipments of iron ore, all from Cruz Grande, Chile, and for account of Bethlehem Steel Co., arrived here during the period from April 1 to April 6 inclusive. These arrivals were 21,800 tons, April 1; 22,000, April 2; and 21,500 tons, April 6. Also there arrived during that period 1400 tons of manganese ore from Calcutta for the account of United States Steel Corp. This shipment came in April 1 and followed closely the arrival of 8491 tons also from Calcutta and for the same account, March 27.

Recent chrome ore shipments included 4198 tons from Lorenco Marquis, Portuguese East Africa, and 3597 tons from Beira, Portuguese Africa, both arriving March 28. A shipment of 950 tons of ilmenite sand came in from Koilthottam, India, on the same date.

Coulee Dam Work Let

Bureau of reclamation has announced award of about $400,000 worth of metal work for Grand Coulee dam. Bethlehem Steel Co. will furnish 1140 racks at $146,616, 1180 racks for nine of the main penstocks and 250 for three station service penstocks, at $176,410.

John W. Beam, Denver, will furnish 630 rack guides for outlet works system at $19,750. Mississippi Valley Structural Steel Co., Melrose Park, Ill., will furnish 5000 bearing and tie plates for trashrack structures, at $58,300.

Equipment

Chicago—Machinery and plant equipment sales are fairly steady, but the number of new inquiries points to little likelihood of an early pickup in business. Machine tool sales are receiving considerable support from export demand, with domestic purchases usually limited to small individual orders. The Santa Fe is postponing action on its recent list until summer although the Milwaukee road has closed on most of the approximately 20 items on its list. Few inquiries are appearing from other roads. Small tool buying is slow and generally unchanged.

Boston—Supported largely by substantial backlogs for export, machinery and equipment builders are confronted with irregular and conservative buying by domestic industrial users of machine tools. Estimating on prospective business has also slackened. Nevertheless, some shops are booking a fairly good volume of machinery for industrial needs, usually one or two tools at a time which have been previously figured. The aggregate volume in some instances is better than appears on the surface. This is especially true of some shops in the Bridgeport, Conn., district. Springfield, Mass., armory has a substantial list up for figures, including parts closing this week, reamers, cutters, countersinks, arbors, broaches and metal slitting saws, while April 29 the armory closes on four horizontal surface grinders, two automatic single spindle screw machines, and two speed lathes.

Orders for government shops are increasing, a few outstanding purchases including: plate scarfing and plate edge planer, Washington navy yard, William Sellers & Co., Philadelphia, $68,100; five engine lathes, Watervliet, N. Y., arsenal, to Lodge & Shipley Machine Tool Co., Cincinnati, and a boring, drilling and milling machine, Washington, Swind Machinery Co., Philadelphia, low, $70,976.

Seattle — Road equipment and electrical items continue in best demand, other lines being slow. Mining interests are placing seasonal orders but fish cannery operations are delayed owing to a labor impasse. Logging and lumbering are not making heavy replacements.

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Construction and Enterprise

New York

BINGHAMTON, N. Y.—City revised plans for sewerage system and sewage disposal plant so as to harmonize with flood control project. Cost $1,500,000.

GARDEN CITY, N. Y.—Board of water commissioners will hold a special election April 22, to vote on proposition of spending $100,000 on water system improvements. If approved, city will buy 300,000-gallon storage tank, three new wells, and new pumping equipment.

ITHACA, N. Y.—New York State Electric & Gas Corp., Ithaca, plans extensions in primary and secondary lines for rural electrification in group of about 33 counties in Northern New York. Includes power substation and service facilities and 245 miles of line. Work scheduled for completion in 1938. Fund of $250,000 arranged through federal aid to defray part of project cost.

NEW YORK — M. Breuer Iron Works Inc. was incorporated here with $10,000 capital. Albany Service Co., 315 Broadway, New York, correspondent.

NEW YORK — Bi-metal Piston Ring Corp. was recently incorporated here with 100 shares no par value stock to manufacture machinery and appliances. Perlie P. Fallon, 101 Park avenue, New York, incorporator.

RIPLEY, N. Y.—Village plans filing application with WPA for grant to finance constructing sewage treatment plant and sewers. Cost $87,000. Hill & Hill, 24 East Main street, northeast, engineers.

TIVOLI, N. Y.—City has plans for constructing sewers and sewage disposal plant. Maturity soon. Will probably use WPA labor. Cost over $25,000. Morrell Vrooman, Inc., 21 North Main street, Gloversville, engineer.

Connecticut

HARTFORD, CONN. — Connecticut Power Co. has plans under way for extensions in transmission and distribution lines in districts including Housatonic and Farmington valley areas. Includes added power and substation facilities. Cost $150,000.

Massachusetts

BOSTON—Boston Edison Co. has filed plans for extensions and improvements to switching station at 776 Summer street, including installing equipment.

New Jersey

HOBOKEN, N. J.—General Foods Corp., 250 Park avenue, New York, plans installing motors and controls, conveyors, regulators, electric hoists and other equipment in new one-story and multi-story food products plant at Hudson and Twelfth streets, Hoboken, where large site has been acquired. Work scheduled to begin soon. Cost $1,000,000.

JERSEY CITY, N. J.—National Transformer Corp. has leased building at Paterson, N. J., which will be used to expand manufacturing facilities.

TRENTON, N. J.—Pennsylvania Railroad Co., Philadelphia, has plans near completion for extensions in electrification system from main line at Trenton to Coalport yard freight branch-off at East Trenton. Work begins in April.

Pennsylvania

MEADVILLE, PA.—Northwestern Rural Co-operative association, B. Hecker, manager, Meadville, plans erecting 200 miles electric rural transmission lines in Crawford and Erie counties. Cost $200,000.

Ohio

MANSFIELD, O.—City approved issuance of $64,000 bonds for waterworks improvement project. City will soon take bids on constructing tank tower and booster pumps at reservoir at cost of $20,000. In addition, specifications call for 150,000-gallon tank and two electric control booster pumps with 3000-gallon-per-minute capacity.

MASSILLON, O.—City plans extending sanitary sewage system and making improvements at municipal disposal plant. Cost $175,884. Maturity this year. C. E. Rice, city engineer.

MAUMEE, O.—City plans renovating municipal waterworks system. Cost $39,500. City engineering department, engineers.

WRIGHT FIELD, DAYTON, O.—War department, air corps, takes bids to 10 a. m., April 21, for two motor-generator sets, type B-1, 60 cycle alternating current, and one motor-generator set, type B-1, 25 cycle alternating current, and eight road graders, delivery f.o.b. manufacturer's plant; until 10 a. m., April 22, for 305 ratchet automatic screwdrivers with three bits, and 10,500 low-voltage capacitors, delivery f.o.b. manufacturer's plant.

ZANESVILLE, O. — American Rolling Mill Co., Middletown, O., will make improvements to its plant at Zanesville. Cost $300,000.

Michigan

BAY CITY, MICH.—Electric Auto-Lite Co., Bay manufacturing division, has practically completed addition to steam powerhouse and plans installing 750-horsepower boiler unit with auxiliary equipment. Cost $45,000.

HOMER, MICH.—Plans for constructing sewage disposal plant and sewer system for village of Homer have been completed by Smith & Niles, Toledo, O., engineers. Cost $175,000.

LANSING, MICH.—President Roosevelt has approved constructing water conditioning plant here as WPA project. Total cost $568,000. Federal government will allot $253,316 for the project.

Illinois

CHICAGO — Two buildings of the Illinois Malleable Iron Co. were recently damaged by fire.

HOOPESTON, Ill. — City approved $45,000 in bonds for constructing trickling filter type sewage disposal plant complete with auxiliary equipment. Cost $60,000 to $65,000. PWA allotted $21,000. Greeley & Hanson, North Michigan avenue, Chicago, engineers.

ROCK ISLAND, ILL.—People's Power Co., Moline, Ill., will begin superstructure soon for new two and three-story operating and service building at Fourth and Eighteenth streets, Rock Island. Includes meter and meter repair divisions in addition to other departments. Cost with equipment $235,000. Contract for building erection let to Stoehr & Palmgren, 2129 Sixteenth street, Moline, Ill.

Indiana

INDIANAPOLIS—City Brass & Aluminum Foundry Corp. was incorporated here to do business at 424 South Pennsylvania street. Harry Menzel, J. J. Mitchum, M. P. Schaefer, and F. M. Jones, incorporators.

MARION, IND.—Board of public works, city hall, plans new water filter. Cost $25,000. C. H. Barney, mayor.

Alabama

DECATUR, ALA.—City, John A. Caddell, city attorney, soon takes bids for electric distribution system which will transmit TVA power. PWA approved specifications. City has $286,000 PWA loan. Total cost of project $350,000.

Maryland

SYKESVILLE, MD. — H. P. Hopkins, 10 East Mulberry street, Baltimore, architect, soon lets contract for altering and constructing addition to powerhouse equipment, alterations and additions to water supply system at Springfield state hospital, for the state. PWA project.

District of Columbia

WASHINGTON — General purchasing officer, Panama canal, takes bids to 10:30 a. m., April 20, schedule 3346, for pipe fittings, metal valves, bibb cocks, cylinder cocks, corporation stop cocks, steel-wire nails and caterpillar-tread tractor; until 10:30 a. m., April 25, schedule 3347, for structural steel, steel plates, sheets and bars, welded steel pipes, chain hoist, power cable, electric motors, industrial control relays, control gaps and cartridge type resistors, all items delivery Cristobal or Balboa, Isthmus of Panama, Canal zone.

Georgia

CARTERSVILLE, GA. — Coca-Cola Bottling Co., Alfred L. Barrow, Rome, Ga., has plans by Odis Clay Poundstone, architect, Palmer building, Atlanta, for bottling plant.

North Carolina

FARMVILLE, N. C. — Pitts & Greene Electric Membership Corp. has allotment of $5560 in addition to $27,000 already allotted for constructing lines in Pitts and Greene counties. Cost $85,000.

Tennessee

KNOXVILLE, TENN. — City plans calling for bids soon on various parts of project for municipal electric distribution system, including overhead distribution lines in district No. 1 (contract 3), unit substation equipment (contract 4), main power substation equipment (contract 5), transformers, switchgear and accessory apparatus (contract 6), watt-hour meters (contract 7), distribution transformers and accessories (contract 8), overhead lines in districts 3 and 4 (contract 9). Cost of entire project $2,500,000. Financing through federal aid. Burns & McDonnell Engineering Co., 107 West Linwood boulevard, Kansas City, Mo., consulting engineer.

NEW BERN, TENN.—City, C. S. Thompson, mayor, receives bids April 28 for constructing electric distribution line. L. O. Brayton Engineering Co., Dyersburg, Tenn., engineer.

RIPLEY, TENN.—City, B. C. Furham, mayor, plans constructing municipal power distribution system.

West Virginia

KANAWHA CITY, W. VA.—Appalachian Electric Power Co., Roanoke, Va., has approved plans for new power sub-

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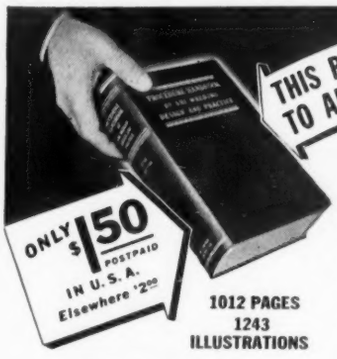

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Missouri

COLUMBIA, MO. — City, care of D. E. Crane, superintendent, water and light department, plans constructing municipal light and power plant addition. Mayor soon lets contract for furnishing and installing, boiler, steam generating unit, boiler feed pumps, circulating water pumps, power piping wiring, low-pressure exhaust heater (closed type) and auxiliary equipment for power plant addition. W. M. Cauthorn, city engineer. Burns & McDonnell, 107 West Linwood boulevard, Kansas City, Mo., engineers.

JEFFERSON CITY, MO. — State building commission, E. Eagan, secretary, 42 Capitol building, rejected bids received Feb. 1 and is taking new ones for altering and constructing additions to power plant, steam distribution piping, power piping, primary electrical distribution system and water distribution system at state penitentiary. Cost $600,000.

Wisconsin

LA CROSSE, WIS. — Northern States Power Co., Eau Claire, Wis., has concluded arrangements for purchase of site on French island, La Crosse, for new steam-electric generating plant. Will include transmission line for connection with present system. Cost $1,500,000. (Noted in STEEL, March 28, 1938).

Minnesota

LITCHFIELD, MINN.—Plans and specifications for constructing sewage disposal plant are being prepared by Foster & Wahlberg, 316 Medical Arts building, Duluth, consulting engineers. Cost $60,000. William V. Martinson, city clerk.

MORA, MINN.—Plans and specifications for installing additional engine at municipal power plant are being prepared by Burlingame, Hitchcock & Estabrook, 521 Sexton building, Minneapolis, consulting engineers. Will call for bids about May 1.

NEW PRAGUE, MINN. — Le Sueur County REA association has selected Banister Engineering Co., 1586 University avenue, St. Paul, consulting engineer, to make a survey for constructing 150 miles rural transmission lines.

NEW ULM, MINN.—City, A. C. Sannwald, city clerk, is taking bids to 5 p. m., April 19, for furnishing one deep-well turbine pump. J. W. Ulrich, superintendent, electric light and waterworks.

STAPLES, MINN. — P. C. Bettenburg Inc., 1437 Marshall avenue, St. Paul, is working on preliminary plans for constructing water softening plant. City, B. C. Barrett, city clerk, will make application for aid to WPA.

WINTHROP, MINN.—Voters approved bond issue at April 5 election to finance constructing municipal heating plant complete with automatic stokers, vacuum pumps, conveyor, distribution system and other equipment. Cost $63,000. George Schemann, city clerk. George Hueiskamp, city engineer. Rose & Harris, 416 Essex building, Minneapolis, consulting engineers.

Texas

EAGLE PASS, TEX.—B. H. Tate, district WPA administrator, Laredo, Tex., has $18,374 to complete and adjust city sewage disposal plant.

HOUSTON, TEX.—Firestone Tire & Rubber Co., 421 North Main street, will erect two-story plant addition. Plans by C. Chase Jr., 911 Stuart street, Houston. Cost $60,000.

JOAQUIN, TEX.—Portex Oil Co., Portland, Oreg., is clearing site for recycling plant located in Shelby county two miles west of Logansport, La., and east of Joaquin. Four high-pressure separators will be installed. Cost $150,000.

LAFERIA, TEX.—Laferia Canning Co. started work on canning plant. Will install equipment. Cost of equipment $25,000. Address equipment proposals to company. V. L. Rowland, Laferia, architect. R. Hansen, Laferia, construction engineer.

Kansas

DELPHOS, KANS.—City, J. R. Manual, mayor, soon takes bids for constructing sewers and sewage disposal plant, complete with piping and appurtenances. Cost $65,000. Paulette & Wilson, Salina, Kans., engineers.

HUTCHINSON, KANS.—Petition is being circulated calling for election May 10 on $2,075,000 bond issue to finance constructing complete waterworks plant. Z. A. Young, city clerk.

South Dakota

BELLE FOURCHE, S. DAK. — Plans of the Belle Fourche Irrigation District, W. D. Buchholz, secretary, have been approved by Washington for constructing hydroelectric power plant at the siphon under Belle Fourche river. Cost $30,000.

HILL CITY, S. DAK. — Dakota Power Co., William Treber, manager, is making a survey for constructing 15-mile high power line from its Big Bend plant to Hill City. Cost $30,000.

Nebraska

AUBURN, NEBR.—Voters at April 5 election approved proposal to purchase a light plant operated at present by Western Public Service Co. If unable to purchase plant, city will build one.

COZAD, NEBR.—City, Carl Gustafson, city clerk, approved at election, April 5, a $275,000 bond issue to finance either purchasing or constructing municipal electric light plant and distribution system. (Noted in STEEL, March 7, 1938.)

GRAND ISLAND, NEBR.—City, F. S. White, city clerk, will purchase an additional boiler for its light and power plant. Estimated cost $50,000. Plans not complete as yet.

HASTINGS, NEBR. — Central Nebraska Power & Irrigation District, R. O. Canaday, secretary, Third street and St. Joseph avenue, is taking bids to 11 a.m., April 22, for furnishing all labor and materials for constructing various power and transmission lines as per specifications on file with secretary. Will also take bids closing on same date for constructing distribution substation at Minden. H. S. Hunt, Jackson, Mich., consulting engineer for complete project.

WAYNE, NEBR.—Application has been filed with REA for organizing rural power project in the county to serve 800 farms. (Noted in STEEL, March 14, 1938.)

Iowa

CHARLES CITY, IOWA — City will hold special election April 19 on application for franchise by Iowa Public Service Co., which, if franchise is granted, will construct new boulevard lighting system throughout city using 600-candle-power lamps.

DAKOTA CITY, IOWA — Voters approved $3500 bond issue March 28 to finance in part constructing filtration plant. (Noted in STEEL, March 28, 1938).

DEWITT, IOWA — Eastern Iowa Light & Power Co-operative, Chester Lake, project manager, has obtained applications from 475 customers for constructing 225 miles rural transmission lines. Plans will be submitted to REA for approval soon.

FRASER, IOWA — Fort Dodge, Des Moines & Southern Railroad Co., Boone, Iowa, has begun extensions and improvements to steam-electric power plant at Fraser. Includes installing additional equipment.

MASON CITY, IOWA — Franchise has been granted to Peoples Gas & Electric Co. to construct 133 miles rural transmission lines in Cerro Gordo, Floyd and Mitchell counties.

MUSCATINE, IOWA — Eastern Iowa Light & Power Co-operative, Chester Lake, project manager, has 150 signatures of prospective customers asking for extension of rural transmission lines for electric service.

NEW HAMPTON, IOWA—City council, Alvah Griffith, city clerk, has accepted report by Ralph W. Gearhart, Cedar Rapids, consulting engineer, and will issue revenue bonds to finance improving municipal light plant, consisting of installing diesel engines, cooling tower, fuel tanks and other items.. Plans and specifications to be completed soon and bids asked. Estimated cost $100,000. (Noted in STEEL, April 4, 1938.)

PRINCETON, IOWA—Voters approved granting franchise to the Peoples Light Co., which will make improvements at its plant. Plans are being prepared.

TRIPOLI, IOWA — Voters approved proposition calling for installing filter at waterworks plant. (Noted in STEEL, April 4, 1938.)

Colorado

LA JUNTA, COLO. — City council plans special election May 10 to vote $497,000 bonds to construct 2000-kilowatt diesel power plant.

Pacific Coast

PORTLAND, OREG.—Survey has started on proposed 220,000-volt transmission line from Bonneville to Vancouver, Wash., and Portland.

PORTLAND, OREG.—City council has under advisement sewage disposal project for entire St. Johns district. Cost $4,115,141. A. C. Forester, Portland, engineer.

SEATTLE — Seattle Iron & Metals Corp. has purchased site on which it will erect buildings. Cost $40,000.

SEATTLE—City light department has set April 21 as date for receiving second bids for constructing 116-mile transmission power line from Skagit river project to Seattle, involving six lines and 700 miles of wire.

Canada

CAP DE LA MADELEINE, QUE.—E. Massicotte, Champlain, is making plans for constructing private gasoline and storage plant. Cost $100,000. Private plans.